Appendix B Corona Climate Action Plan

CITY OF CORONA

Climate Action Plan

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ACRONYMS

AB 32 Assembly Bill 32, The California Climate Change Solutions Act of 2006

ATMS Advanced Transportation Management Systems

ADWF Average Daily Wastewater Flow

BAU Business as usual scenario

BTU British thermal unit

CARB California Air Resources Board

CAA Clean Air Act

CAAQS California Ambient Air Quality Standards
Cal EPA California Environmental Protection Agency

CAS California Climate Adaption Strategy

CAT Climate Action Team

C-CAP Corona Climate Action Plan

CCAT California Climate Action Team

CCAR California Climate Action Registry

CCR California Code of Regulations

CCTP Climate Change Technology Program

CEC California Energy Commission

CEQA California Environmental Quality Act

CFC Chlorofluorocarbons C_2F_6 Hexafluoroethane CF_4 Carbon Tetrafluoride

CH₄ Methane

CIWMB California Integrated Waste Management Board

CO Carbon Monoxide
CO₂ Carbon Dioxide

CO₂e Equivalent Carbon dioxide CSD Community Services District

DKM dekatherm

DMS Dynamic Message Signs
DPM Diesel Particulate Matter

EMFAC2007 On-Road Emission Factors published by the CARB in 2007

GCC Global Climate Change

GHG Greenhouse Gas

GWh Gigawatt Hours

GWP Global Warming Potential

HFC Hydrofluorocarbons
HFC-23 Trifluoromethane

HFC-134 Hydrofluorocarbon 134

HFC-152a Difluoroethane

IPCC Intergovernmental Panel on Climate Change

ITS Intelligent Transportation Systems

Lbs/year Pounds per Year

LEED Leadership in Energy and Environmental Design

LSA LSA Associates Inc. Traffic consultant

MMBTU Million BTUs

MMT Million Metric Tons

MMT CO₂e Million Metric Tons Carbon Dioxide Equivalent

MWD Metropolitan Water District of Southern California

MHh/year Megawatt hours per year

MWh Megawatt hours N_2O Nitrous Oxide

O₃ Ozone

OPR California Office of Planning and Research
PSD Prevention of Significant Deterioration

SCAG Southern California Association of Governments
SCAQMD South Coast Air Quality Management District

SCE Southern California Edison

SCG Southern California Gas Company

SIP State Implementation Plan

SF₆ Sulfur Hexafluoride SRI Solar Reflective Index

TMC Traffic Management Center

UNFCCC United Nations Framework Convention on Climate Change
URBEMIS 2007 Urban Emissions Model, version 9.2 published in June 2007

USEPA United States Environmental Protection Agency

VMT Vehicle miles traveled

EXECUTIVE SUMMARY

The City of Corona is committed to providing a more livable, equitable and economically vibrant community through the reduction of greenhouse gas (GHG) emissions. By using energy more efficiently, harnessing renewable energy to power our buildings, recycling our waste, and enhancing access to sustainable transportation modes, we can keep dollars in our local economy, create new green jobs and improve community quality of life. These efforts toward reducing GHG emission must be done in coordination with the City's land use decisions. The foundation of planning land use decisions is found in the General Plan policies and programs.

Corona has established goals and policies that incorporate environmental responsibility into its daily management of residential, commercial and industrial growth, education, energy and water use, air quality, transportation, waste reduction, economic development, and open space and natural habitats to further their commitment.

The City has developed a baseline community-wide GHG emissions inventory, a methodology for tracking and reporting emissions in the future, and recommendations for GHG reduction strategies as a foundation for these efforts. An indicator of the success of these efforts will be a measured reduction in greenhouse gas (GHG) emissions using the protocols discussed herein.

Corona has elected to be a green and sustainable community. To accomplish this, Corona 's community of residents, neighbors, workers, and visitors strive together to balance ecological, economic, and social needs to ensure a clean, healthy and safe environment for all current members of society and for generations to come.

Chapter 1 Introduction

The City of Corona is committed to providing a more livable, equitable and economically vibrant community through the reduction of greenhouse gas (GHG) emissions. By using energy more efficiently, harnessing renewable energy to power our buildings, recycling our waste, and enhancing access to sustainable transportation modes, we can keep dollars in our local economy, create new green jobs and improve community quality of life. These efforts toward reducing GHG emission must be done in coordination with the City's land use decisions. The foundation of planning land use decisions is found in the General Plan policies and programs.

The policies and programs of the City General Plan are intended to underlie most land use decisions. Preparing, adopting, implementing, and maintaining a general plan serves to:

- Define the community's environmental, social, and economic goals;
- Provide citizens with information about their community and to provide them with opportunities to participate in the planning process;
- Provide residents with opportunities to participate in the planning and decision-making processes of their community;
- Coordinate the community and environmental protection activities among local, regional, state and federal agencies; and
- Guide in the development of the community.

Chapter 5, the Environmental Resources Element, of the General Plan addresses a number of different natural resources within the City that must be managed properly. Among these resources are energy, air quality, and the control of GHG emissions. Goals within the Environmental Resources Element specifically speak to energy conservation and air quality. In order to implement this goal, to provide a more livable, equitable and economically vibrant community, and preserve the attributes of its unique valley location and quality lifestyle, the City has committed to prepare and implement the Corona Climate Action Plan (C-CAP). Further, the plan will ensure that the impact of development on air quality is minimized, energy conserved, and that land use decisions made by the City and all internal operations within the City are consistent with adopted state legislation.

This section describes the purpose and goals of the C-CAP; describes the relationship of the C-CAP to the City General Plan; provides background information on GHG emissions; and summarizes the regulatory framework surrounding GHG emissions and climate change.

1.1 Purpose

The C-CAP was designed under the premise that the City and the community it represents are uniquely capable of addressing emissions associated with sources under the City's jurisdiction. The City's emission reduction efforts should coordinate with the state strategies in order to accomplish emission reductions in an efficient and cost effective manner. The City developed this document with the following purposes in mind:

- Create a GHG baseline from which to benchmark GHG reductions;
- Provide a plan that is consistent with and complementary to: the GHG emissions reduction efforts being conducted by the State of California through the Global Warming Solutions Act (AB 32); the Federal Government through the actions of the Environmental Protection Agency; and the global community through the Kyoto Protocol;
- Guide the development, enhancement, and implementation of actions that aggressively reduce
 GHG emissions; and
- Provide a policy document with specific implementation measures meant to be considered as part of the planning process for future development projects.

1.2 Goals

To fulfill the purposes of the C-CAP, the City identified the following achievement goals:

- Provide a list of specific actions that will reduce GHG emissions, with the highest priority given to actions that provide the greatest reduction in GHG emissions and benefits to the community at the least cost;
- Reduce emissions attributable to Corona to levels at or below 1990 GHG emissions by year 2020 consistent with the target reductions of AB 32; and
- Establish a qualified reduction plan for which future development within the City can tier and thereby streamline the environmental analysis necessary under the California Environmental Quality Act (CEQA).

1.3 Relationship to the City's General Plan

The Corona General Plan discusses the City's vision and the realization of this vision through four key areas: Community Development, Infrastructure and Public Services, Environmental Resources, and Environmental Hazards and Public Safety. The General Plan also includes implementation tools that are presented as separate policies and documents.

The C-CAP is another implementation tool of the General Plan that can be used to guide development in the City by focusing on attaining the various goals and policies of the General Plan as well as the GHG reduction goals outlined in Section 1.2 above.

1.4 Background

The C-CAP achieves the purpose and goals described above by providing: an analysis of GHG emissions and sources attributable to the City of Corona; estimates on how those emissions are expected to increase; recommended policies and actions that can reduce GHG emissions to meet State, Federal and

CHAPTER 1 INTRODUCTION

International targets; a timeline of implementation; and a defined tracking and reporting mechanism that will measure progress toward the goals.

In order to understand this process, the reader needs to understand a few facts about GHG emissions, the climate change impacts anticipated within the City of Corona, and the international, federal, State, and local regulatory framework designed to address climate change. The following provides a brief background on these topics, with a more complete description of the greenhouse effect, GHG emissions, and general climate change impacts included in Appendix A of this document.

1.5 Greenhouse Gases

Parts of the Earth's atmosphere act as an insulating blanket of just the right thickness, trapping sufficient solar energy to keep the global average temperature within a suitable range. The 'blanket' is a collection of atmospheric gases called 'greenhouse gases' based on the idea that these gases also trap heat like the glass walls of a greenhouse. These gases, mainly water vapor, carbon dioxide (CO_2) , methane (CH_4) , nitrous oxide (N_2O) , ozone (O_3) , and chlorofluorocarbons (CFCs) all act as effective global insulators, reflecting back to earth infrared radiation. Human activities, such as producing electricity and driving internal combustion vehicles, emit these gases in the atmosphere.

Due to the successful global bans on chlorofluorocarbons (primarily used as refrigerants, aerosol propellants and cleaning solvents), Corona does not generate significant emissions of these GHGs and therefore, they are not considered any further in this analysis. This also includes other synthesized gases such as HFCs and CF₄ which have been banned and are no longer available on the market. Because of the ban, the City of Corona will not generate emissions of these GHGs and therefore, they are not considered any further in this analysis.

Another GHG with a high global warming potential is Sulfur hexafluoride (SF₆), which is mainly used as a gaseous dielectric medium in electric switchgear of high voltage electric transmission lines and medical use in retinal detachment surgery and ultrasound imaging. In both uses, SF₆ is not released to the atmosphere and therefore, it is not considered further in this analysis.

Because GHGs have variable potencies, a common metric of carbon dioxide equivalents (CO_2e) is used to report the combined potency from all of the GHGs. The potency each GHG has in the atmosphere is measured as a combination of the volume of its emissions and its global warming potential¹, and is expressed as a function of the potency with respect to the same mass of CO_2 . Thus, by multiplying the individual gas by its global warming potential, the emissions of each individual gas can be measured in terms of metric tons of CO_2e (MT CO_2e).

¹¹ The potential of a gas or aerosol to trap heat in the atmosphere.

1.6 Regulatory Setting

In an effort to stabilize GHG emissions and reduce impacts associated with climate change, international agreements, as well as federal and State actions were implemented beginning as early as 1988. The international, federal, State, regional, and local government agencies discussed below work jointly, as well as individually, to address GHG emissions through legislation, regulations, planning, policy-making, education, and a variety of programs.

International and Federal



KYOTO PROTOCOL

The United States participated in the United Nations Framework Convention on Climate Change (UNFCCC) (signed on March 21, 1994). The Kyoto Protocol is a treaty made under the UNFCCC and was the first international agreement to regulate GHG emissions. It has been estimated that if the commitments outlined in the Kyoto Protocol are met, global GHG emissions could be reduced by an estimated 5 percent from 1990 levels during the first commitment period of 2008–2012. It should be noted that although the United States is a signatory to the Kyoto Protocol, Congress has not ratified the Protocol, and the United States is not bound by the Protocol's commitments.

In anticipation of providing an updated international treaty for the reduction of GHG emissions, representatives from 170 countries met in Copenhagen in December 2009 to ratify an updated UNFCCC agreement². The Copenhagen Accord, a voluntary agreement among the United States, China, India, and Brazil, recognizes the need to keep global temperature rise to below 2 °C and obliges signatories to establish measures to reduce greenhouse gas emissions and to prepare to provide help to poorer countries in adapting to Climate Change. It is anticipated that the Copenhagen Accord will be finalized and signed by representatives of the participating governments by the end of 2010.

CLIMATE CHANGE TECHNOLOGY PROGRAM

The United States has opted for a voluntary and incentive-based approach toward emissions reductions in lieu of the Kyoto Protocol's mandatory framework. The Climate Change Technology Program (CCTP) is a multi-agency research and development coordination effort (which is led by the Secretaries of Energy

United Nations Framework Convention on Climate Change, http://unfccc.int/home/items/5262.php, December 2009

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and Commerce) that is charged with carrying out the President's National Climate Change Technology Initiative.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY



The United States Environmental Protection Agency (USEPA) is responsible for implementing federal policy to address global climate change. The Federal government administers a wide array of public-private partnerships to reduce GHG intensity generated by the United States. These programs focus on energy efficiency, renewable

energy, methane and other non- CO_2 gases, agricultural practices, and implementation of technologies to achieve GHG reductions. The USEPA implements several voluntary programs that substantially contribute to the reduction of GHG emissions.

In Massachusetts v. Environmental Protection Agency (Docket No. 05–1120), argued November 29, 2006 and decided April 2, 2007, the U.S. Supreme Court held that the USEPA has authority to regulate greenhouse gases, and the USEPA's reasons for not regulating this area did not fit the statutory requirements. As such, the U.S. Supreme Court ruled that the USEPA should be required to regulate CO₂ and other greenhouse gases as pollutants under Section 202(a)(1) of the federal Clean Air Act (CAA).

The USEPA issued a Final Rule for mandatory reporting of GHG emissions in October of 2009. This Final Rule applies to fossil fuel suppliers, industrial gas suppliers, direct GHG emitters, and manufactures of heavy-duty and off-road vehicles and vehicle engines, and requires annual reporting of emissions. The Final Rule was effective December 29th 2009 with data collection to begin on January 1st 2010 and the first annual reports due in March of 2011³. This rule does not regulate the emission of GHGs it only requires the monitoring and reporting of greenhouse gas emissions for those sources above certain thresholds. USEPA adopted a Final Endangerment Finding for the six defined GHGs on December 7, 2009. The Endangerment Finding is required before USEPA can regulate GHG emissions under Section 202(a) (1) of the CAA in fulfillment of the U.S. Supreme Court decision.

On May 13, 2010, the USEPA issued a final rule that establishes a common sense approach to addressing greenhouse gas emissions from stationary sources under the CAA permitting programs. This final rule sets a threshold of 75,000 tons per year for GHG emissions. New and existing industrial facilities that meet or exceed that threshold will require a permit under the New Source Review Prevention of Significant Deterioration (PSD) and title V Operating Permit programs. This rule will take effect on January 2, 2011.

USEPA, Final Rule for mandatory reporting of GHG emissions, http://www.epa.gov/climatechange/emissions/downloads09/GHG-MRR-FinalRule.pdf, October 2009.

State

CALIFORNIA AIR RESOURCES BOARD



The California Air Resources Board, a part of the California EPA (CalEPA) is responsible for the

coordination and administration of both federal and state air pollution control programs within California. In this capacity, CARB conducts research, sets state ambient air quality standards (California Ambient Air Quality Standards (CAAQS)), compiles emission inventories, develops suggested control measures, and provides oversight of local programs. CARB establishes emissions standards for motor vehicles sold in California, consumer products (such as hairspray, aerosol paints, and barbecue lighter fluid), and various types of commercial equipment. It also sets fuel specifications to further reduce vehicular emissions. CARB has primary responsibility for the development of California's State Implementation Plan (SIP), for which it works closely with the federal government and the local air districts.

EXECUTIVE ORDER S-3-05

California Governor Arnold Schwarzenegger announced on June 1, 2005, through Executive Order S-3-05, the following GHG emission reduction targets:

- By 2010, California shall reduce GHG emissions to 2000 levels;
- By 2020, California shall reduce GHG emissions to 1990 levels; and
- By 2050, California shall reduce GHG emissions to 80 percent below 1990 levels.

The first California Climate Action Team (CCAT) Report to the Governor in 2006 contained recommendations and strategies to help meet the targets in Executive Order S-3-05. In April 2010, the Draft California Action Team (CAT) Biennial Report expanded on the policy oriented 2006 assessment. The new information detailed in the CAT Assessment Report includes development of revised climate and sea-level projections using new information and tools that have become available in the last two years; and an evaluation of climate change within the context of broader social changes, such as landuse changes and demographic shifts ⁴. The action items in the report focus on the preparation of the Climate Change Adaptation Strategy, required by Executive Order S-13-08, described below.

ASSEMBLY BILL 32, THE CALIFORNIA GLOBAL WARMING SOLUTIONS ACT OF 2006

In 2006, the California State Legislature adopted AB 32, the California Global Warming Solutions Act of 2006. AB 32 focuses on reducing GHG



California Environmental Protection Agency, Climate Action Team Report to Governor Schwarzenegger and the Legislature, March 2006.

in California. GHGs as defined under AB 32 include carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride. AB 32 required CARB to adopt rules and regulations that would achieve greenhouse gas emissions equivalent to 1990 statewide levels by 2020. On or before June 30, 2007, CARB was required to publish a list of discrete early action GHG emission reduction measures that would be implemented by 2010. The law further required that such measures achieve the maximum technologically feasible and cost effective reductions in GHGs from sources or categories of sources to achieve the statewide greenhouse gas emissions limit for 2020.

CARB published its final report for Proposed Early Actions to Mitigate Climate Change in California in October 2007. This report described recommendations for discrete early action measures to reduce GHG emissions. The measures included are part of California's strategy for achieving GHG reductions under AB 32. Three new regulations are proposed to meet the definition of "discrete early action greenhouse gas reduction measures," which include the following: a low carbon fuel standard; reduction of HFC-134a emissions from non-professional servicing of motor vehicle air conditioning systems; and improved landfill methane capture⁵. CARB estimates that by 2020, the reductions from those three measures would be approximately 13-26 million metric tons (MMT) CO₂e.

Under AB 32, CARB has the primary responsibility for reducing GHG emissions. CARB has published a staff report titled California 1990 GHG Emissions Level and 2020 Emissions Limit⁶ that determined the statewide levels of GHG emissions in 1990 to be 427 MMT CO₂e. Additionally, in December 2008, CARB adopted the Climate Change Scoping Plan, which outlines the State's strategy to achieve the 2020 GHG limit. This Scoping Plan proposes a comprehensive set of actions designed to reduce overall greenhouse gas emissions in California, improve the environment, reduce dependence on oil, diversify energy sources, save energy, create new jobs, and enhance public health. The plan emphasizes a cap-and-trade program, but also includes the discrete early actions.

SENATE BILL 97 (SB 97)

SB 97, enacted in 2007, amends the CEQA statute to clearly establish that GHG emissions and the effects of GHG emissions are appropriate subjects for CEQA analysis. It directed the California Office of Planning and Research (OPR) to develop draft State CEQA Guidelines "for the mitigation of GHG emissions or the effects of GHG emissions" and directed the Resources Agency to certify and adopt the State CEQA Guidelines.

On April 13, 2009, OPR submitted the proposed amendments to the Secretary for Natural Resources. The Natural Resources Agency conducted formal rulemaking in 2009, certified, and adopted the amendments in December 2009. The California Office of Administrative Law codified into law the amendments in March 2010. The amendments became effective in June 2010 and provide regulatory guidance with respect to the analysis and mitigation of the potential effects of GHG emissions.

California EPA- California Air Resources Board, Proposed Early Actions to Mitigate Climate Change in California, October 2007.

California EPA- California Air Resources Board, California 1990 GHG Emissions Level and 2020 Emissions Limit, November 2007.

CEQA Guidelines § 15183.5, Tiering and Streamlining the Analysis of GHG Emissions, was added as part of the CEQA Guideline amendments and describes the criteria needed in a Climate Action Plan that would allow for the tiering and streamlining of CEQA analysis for subsequent development projects. The following quote is from the CEQA Guideline amendments:

"§15183.5. Tiering and Streamlining the Analysis of Greenhouse Gas Emissions.

- (a) Lead agencies may analyze and mitigate the significant effects of greenhouse gas emissions at a programmatic level, such as in a general plan, a long range development plan, or a separate plan to reduce greenhouse gas emissions. Later project-specific environmental documents may tier from and/or incorporate by reference that existing programmatic review. Project-specific environmental documents may rely on an EIR containing a programmatic analysis of greenhouse gas emissions as provided in section 15152 (tiering), 15167 (staged EIRs) 15168 (program EIRs), 15175-15179.5 (Master EIRs), 15182 (EIRs Prepared for Specific Plans), and 15183 (EIRs Prepared for General Plans, Community Plans, or Zoning).
- (b) Plans for the Reduction of Greenhouse Gas Emissions. Public agencies may choose to analyze and mitigate significant greenhouse gas emissions in a plan for the reduction of greenhouse gas emissions or similar document. A plan to reduce greenhouse gas emissions may be used in a cumulative impacts analysis as set forth below. Pursuant to sections 15064(h)(3) and 15130(d), a lead agency may determine that a project's incremental contribution to a cumulative effect is not cumulatively considerable if the project complies with the requirements in a previously adopted plan or mitigation program under specified circumstances.
 - (1) Plan Elements. A plan for the reduction of greenhouse gas emissions should:
 - (A) Quantify greenhouse gas emissions, both existing and projected over a specified time period, resulting from activities within a defined geographic area;
 - (B) Establish a level, based on substantial evidence, below which the contribution to greenhouse gas emissions from activities covered by the plan would not be cumulatively considerable;
 - (C) Identify and analyze the greenhouse gas emissions resulting from specific actions or categories of actions anticipated within the geographic area;
 - (D) Specify measures or a group of measures, including performance standards, that substantial evidence demonstrates, if implemented on a project-by-project basis, would collectively achieve the specified emissions level;
 - (E) Establish a mechanism to monitor the plan's progress toward achieving the level and to require amendment if the plan is not achieving specified levels;
 - (F) Be adopted in a public process following environmental review.

(2) Use with Later Activities. A plan for the reduction of greenhouse gas emissions, once adopted following certification of an EIR or adoption of an environmental document, may be used in the cumulative impacts analysis of later projects. An environmental document that relies on a greenhouse gas reduction plan for a cumulative impacts analysis must identify those requirements specified in the plan that apply to the project, and, if those requirements are not otherwise binding and enforceable, incorporate those requirements as mitigation measures applicable to the project. If there is substantial evidence that the effects of a particular project may be cumulatively considerable notwithstanding the project's compliance with the specified requirements in the plan for the reduction of greenhouse gas emissions, an EIR must be prepared for the project."

One of the goals of the C-CAP is to allow programmatic level review and mitigation of GHG emissions that allows streamlining of CEQA review for subsequent development projects. To accomplish this, the C-CAP framework is designed to fulfill the requirements identified in CEQA Guidelines § 15183.5, above.

EXECUTIVE ORDER S-1-07

Executive Order S-1-07, the Low Carbon Fuel Standard (LCFS) (issued on January 18, 2007), calls for a reduction of at least 10 percent in the carbon intensity of California's transportation fuels by 2020. It instructed the California Environmental Protection Agency to coordinate activities between the University of California, the California Energy Commission and other state agencies to develop and propose a draft compliance schedule to meet the 2020 target. Furthermore, it directed ARB to consider initiating a regulatory proceedings to establish and implement the LCFS. In response, ARB identified the LCFS as an early action item with a regulation to be adopted and implemented by 2010.

EXECUTIVE ORDER S-13-08

On November 14, 2008, Governor Schwarzenegger issued Executive Order S-13-08, the Climate Adaptation and Sea Level Rise Planning Directive, which provides clear direction for how the State should plan for future climate impacts. Executive Order S-13-08 calls for the implementation of four key actions to reduce the vulnerability of California to climate change:

- Initiate California's first statewide Climate Change Adaptation Strategy (CAS) that will assess the State's expected climate change impacts, identify where California is most vulnerable, and recommend climate adaptation policies;
- Request that the National Academy of Sciences establish an expert panel to report on sea level rise impacts in California in order to inform State planning and development efforts;
- Issue interim guidance to State agencies for how to plan for sea level rise in designated coastal and floodplain areas for new and existing projects; and
- Initiate studies on critical infrastructure and land-use policies vulnerable to sea level rise.

The 2009 CAS report summarizes the best known science on climate change impacts in the state to assess vulnerability, and outlines possible solutions that can be implemented within and across state

agencies to promote resiliency. This is the first step in an ongoing, evolving process to reduce California's vulnerability to climate impacts⁷.

CALIFORNIA CODE OF REGULATIONS (CCR) TITLE 24, PART 6

CCR Title 24, Part 6: California's Energy Efficiency Standards for Residential and Nonresidential Buildings (Title 24) were first established in 1978 in response to a legislative mandate to reduce California's energy consumption. The standards are updated periodically to allow consideration and possible incorporation of new energy efficiency technologies and methods. Although it was not originally intended to reduce GHG emissions, electricity production by fossil fuels results in GHG emissions and energy efficient buildings require less electricity. Therefore, increased energy efficiency results in decreased GHG emissions.

The Energy Commission adopted 2008 Standards on April 23, 2008 and the Building Standards Commission approved them for publication on September 11, 2008. These updates became effective on August 1, 2009. The Energy Commission adopted the 2008 changes to the Building Energy Efficiency Standards for several reasons:

- To provide California with an adequate, reasonably priced, and environmentally sound supply of energy;
- To respond to AB 32, the Global Warming Solutions Act of 2006, which mandates that California must reduce its GHG emissions to 1990 levels by 2020;
- To pursue California energy policy, which states that energy efficiency is the resource of first choice for meeting California's energy needs;
- To act on the findings of California's Integrated Energy Policy Report (IEPR) that concludes that the Standards are the most cost effective means to achieve energy efficiency, expects the Building Energy Efficiency Standards to continue to be upgraded over time to reduce electricity and peak demand, and recognizes the role of the Standards in reducing energy related to meeting California's water needs and in reducing GHG emissions;
- To meet the West Coast Governors' Global Warming Initiative commitment to include aggressive energy efficiency measures into updates of state building codes; and
- To meet the Executive Order in the Green Building Initiative to improve the energy efficiency of nonresidential buildings through aggressive standards.

CALIFORNIA CODE OF REGULATIONS (CCR) TITLE 24, PART 11

CCR Title 24, Part 11: California Green Building Standards (Title 24) became effective in 2011 in response to continued efforts to reduce GHG emissions associated with energy consumption. CCR Title 24, Part 11now require that new buildings reduce water consumption, employ building commissioning

⁷ California Natural Resources Agency, 2009 California Climate Adaption Strategy- A Report to the Governor in Response to Executive Order S-13-2008, WWW.Climatechange.Ca.Gov/Adaptation, September 2009

to increase building system efficiencies, divert construction waste from landfills, and install low pollutant-emitting finish materials. One focus of CCR Title 24, Part 11 is water conservation measures, which reduce GHG emissions by reducing electrical consumption associated with pumping and treating water. CCR Title 24, Part 11 has approximately 52 nonresidential mandatory measures and an additional 130 provisions for optional use. Some key mandatory measures for commercial occupancies include specified parking for clean air vehicles, a 20 percent reduction of potable water use within buildings, a 50 percent construction waste diversion from landfills, use of building finish materials that emit low levels of volatile organic compounds, and commissioning for new, nonresidential buildings over 10,000 square feet.

ASSEMBLY BILL 14938

AB 1493 (also known as the Pavley Bill, in reference to its author Fran Pavley) was enacted in 2002 and requires the "maximum feasible and cost effective reduction" of GHGs from automobiles and light-duty trucks. Subsequently, in 2004, CARB approved the "Pavley I" regulations limiting the amount of GHGs that may be released from new passenger automobiles beginning with model year 2009 through 2016; these regulations would reduce emissions by 30% from 2002 levels by 2016. The second set of regulations ("Pavley II") is currently in development and will cover model years 2017 through 2025 in order to reduce emissions by 45% by the year 2020. The automotive industry legally challenged the bill claiming that the federal gas mileage standards preempted these state regulations. In 2005, California filed a waiver request to the U.S. EPA in order to implement the GHG standards and in March of 2008, the U.S. EPA denied the request. However, in June 2009, the decision was reversed and the U.S. EPA granted California the authority to implement the GHG reduction standards for passenger cars, pickup trucks, and sport utility vehicles. In September 2009, CARB adopted amendments to the "Pavley I" regulations that cemented California's enforcement of the Pavley rule starting in 2009 while providing vehicle manufacturers with new compliance flexibility. The amendments also coordinated California's rules with the federal rules for passenger vehicles.

SENATE BILL 1368

SB 1368 was enacted in 2006 and established a standard for baseload generation owned by, or under long-term contract to publicly owned utilities, of 1,100 lbs CO2 e per megawatt-hour (MWh). This will encourage the development of power plants that meet California's growing energy needs while minimizing GHG emissions.

SENATE BILL 375

Senate Bill 375 (SB 375), which establishes mechanisms for the development of regional targets for reducing passenger vehicle greenhouse gas emissions, was adopted by the State on September 30, 2008. On September 23, 2010, CARB adopted the vehicular greenhouse gas emissions reduction targets that had been developed in consultation with the metropolitan planning organizations (MPOs); the targets require a 7 to 8 percent reduction by 2020 and between 13 to 16 percent reduction by 2035 for each MPO. SB 375 recognizes the importance of achieving significant greenhouse gas reductions by working with cities and counties to change land use patterns and improve transportation alternatives. Through the SB 375 process, MPOs will work with local jurisdictions in the development of sustainable

communities strategies (SCS) designed to integrate development patterns and the transportation network in a way that reduces greenhouse gas emissions while meeting housing needs and other regional planning objectives. MPOs will prepare their first SCS according to their respective regional transportation plan (RTP) update schedule; to date, no region has adopted an SCS. The first of the RTP updates with SCS strategies are expected in 2012.

Regional

The City of Corona is located in the South Coast Air Basin, and the South Coast Air Quality Management District (SCAQMD) is the agency principally responsible for comprehensive air pollution control in the Basin. In order to provide GHG emission guidance to the local jurisdictions within the South Coast Air Basin, the SCAQMD has organized a Working Group to develop GHG emission analysis guidance and thresholds.



SCAQMD released a draft guidance document regarding interim CEQA GHG significance

thresholds in October 2008, and issued revised interim CEQA GHG significant threshold in January 2009. On December 5, 2008, the SCAQMD Governing Board adopted the staff proposal for an interim GHG significance threshold for projects where the SCAQMD is lead agency. SCAQMD proposed a tiered approach, whereby the level of detail and refinement needed to determine significance increases with a project's total GHG emissions. The tiered approach defines projects that are exempt under CEQA and projects that are within a GHG Reduction Plan as less than significant.

SCAG is currently in the process of developing the 2012 RTP and SCS for their jurisdiction aimed at attaining the reduction targets of an 8% per capita reduction in GHG emissions from passenger vehicles by the year 2020 and a 13% reduction by 2035. SCAG is currently developing the SCS and expecting to adopt the SCS, RTP, and the associated programmatic EIR in April 2012. Many of the transportation-related reduction measures included in this CAP will coordinate with efforts in SCAG's SCS.

Chapter 2 Methodology

2.1 Overview

The methodology to prepare the GHG inventories in the C-CAP incorporates the protocols, methods and emission factors found in the California Climate Action Registry (CCAR) General Reporting Protocol⁸, and the Local Government Protocol⁹. The Local Government Protocol categorizes GHG emissions into three distinct scopes that provide a way of organizing the C-CAP's development.

Definition of Scopes from Local Government Protocol:

- <u>Scope 1 Emissions</u> includes all "direct" sources of GHG emissions from sources that are owned or controlled by the City including (but not limited to): production of electricity, heat, or steam in owned or controlled boilers, furnaces, etc; transportation (using corporate or fleet vehicles) of materials, products, waste, and community members; and fugitive emissions (from unintentional leaks of GHGs directly into the atmosphere).
- Scope 2 Emissions account for "indirect" sources of GHG emissions from the generation of purchased utilities consumed by the City. A purchased utility is defined as one that is bought or otherwise brought into the jurisdictional authority of the local government, but not physically generated in power plants owned and/or operated by the local government. Scope 2 emissions physically occur at locations outside of the jurisdictional boundaries and direct control of the local government and thus are separated from direct emissions reported by the utility company or local government in order to avoid double counting.
- <u>Scope 3 Emissions</u> is considered an optional reporting category that allows for the treatment of all other "indirect emissions." Scope 3 emissions are a consequence of the activities of the local government, but occur from sources not owned or controlled by the local government.

Because Scope 3 emissions are indirect emissions that are attributable to emissions sources that are not owned or controlled by the City of Corona they are not considered in this C-CAP. Scope 1 emissions are characterized in this report as "direct emissions" While Scope 2 emissions are characterized as "indirect source emissions."

The analysis relative to the C-CAP employs both quantitative and qualitative components. The quantitative analysis contains an inventory of the City's GHG emissions, while the qualitative component involves compliance with the emission reduction strategies contained in federal, State, and local legislation.

The analysis herein is tailored to include all historic, existing, and projected emission sources within the City while providing a comprehensive analysis of GHG impacts and mitigation measures available to reduce impacts to the fullest extent feasible. AB 32 establishes a comprehensive program of regulatory

⁸ California Climate Action Registry, General Reporting Protocol Version 3.1, January 2009

⁹ California Climate Action Registry, Local Government Protocol version 1.1, May 2010

and market mechanisms to achieve real, quantifiable, cost-effective reductions of greenhouse gas emissions and mandates the reduction of CO₂e emissions in California to 1990 levels by 2020.

2.2 GHG Emissions in Corona

The first step in developing the C-CAP was to establish an existing inventory of Corona's GHG emissions. The purpose of this inventory is to identify and categorize the major sources and quantities of GHG emissions currently being produced by the City's residents, businesses and municipal operations. The C-CAP established 2008 as the year on which to base their existing inventory; this is the most recent year for which reliable data is available. This inventory provides a framework on which to design programs and actions that specifically target reductions by emissions sources. Programs and actions already in place within the City are described in Section 4. The existing inventory serves as a reference against which to measure the City's progress towards reducing GHG emissions over time, and documentation for potential emission trading opportunities.

In estimating Corona's total greenhouse gas emissions, data sources from the City, regional, and State agencies were used. For community energy statistics, the following agencies and City departments were consulted: Southern California Edison (SCE), The Southern California Gas Company (SCG), City of Corona, Community Development Department, Planning Division; City of Corona, Department of Water and Power; City of Corona, Community Development Department, Building Division; City of Corona, Information Technology/GIS; City of Corona, Redevelopment Agency; and City of Corona, Parks and Community Services. The following agencies and departments provided transportation information: City of Corona, Public Works Department, Transportation/Traffic Management; City of Corona, Airport Services; California Department of Transportation (Caltrans), Metro link, the California Department of Motor Vehicles, and traffic forecasters at LSA Associates. California Integrated Waste Board (CIWB), Cal recycle and Waste Management California provided information on waste generation. The California Air Resources Board (CARB) and South Coast Air Quality Management District (SCAQMD) provided relevant policy information. In cases where specific data for 2008 was not available, estimates were made by extrapolating from existing data. General estimate calculations and assumptions are compiled in Appendices B through G. All of the contributors to greenhouse gas emissions (kilowatt-hours of electricity generated by fossil fuel combustion in power plants, natural gas in therms, vehicle travel in vehicle miles traveled, and solid waste in tons) are expressed in the common unit of metric tons of carbon dioxide equivalent (CO₂e) released into the atmosphere in a given year.

Corona's main contribution to GHGs is carbon dioxide. The City will directly generate emissions of CO_2 primarily in the form of vehicle exhaust and consumption of natural gas for heating. Corona will also generate methane (CH₄) and nitrous oxide (N₂O) emissions. Methane is directly generated from natural gas and petroleum systems and wastewater treatment while nitrous oxide results predominantly from motor vehicle use.

2.3 Calculation of GHGs

The following summarizes the basis of the GHG calculations by emission source. The emissions calculations follow the California Climate Action Registry (CCAR) General Reporting Protocol, version 3.1¹⁰, Local Government Protocol, version 1.1¹¹, the Urban Forestry Protocol, version 1.1¹² and CARB's Mandatory GHG Reporting Regulations (Title 17, California Code of Regulations, Sections 95100 et seq.). These protocols are consistent with the methodology and emission factors endorsed by SCAQMD, CARB and USEPA. In cases where these protocols do not contain specific source emission factors, current industry standards or the USEPA's AP 42 Compilation of Air Pollution Emission Factors were used.

In addition to emissions, where possible, the total costs were calculated for each sector. The costs were based on the consumer fees for each fuel type included in the inventory. By including the costs, the City of Corona is able to see where consumers are spending the most money and utilize the information in making decisions on reduction measures.

Coefficients and modeling assumptions used in the calculations of GHG's are included in Appendix B. Calculations of GHG's for 2008 and 2020 are included in Appendix D. Since data was not available for 1990, estimations for this inventory were based on square footage of land use given a 15 percent reduction from existing values. This estimation follows CARB recommendation to local governments in the AB 32 Scoping Plan. (CARB 2008) 2020 emissions were estimated from 2008 data using anticipated growth in households and employment provided by SCAG.

GHG emissions are typically segregated into direct and indirect sources as discussed above. However, direct and indirect sources are not completely independent of each other and are often combined into other more encompassing categories. For example, although natural gas combustion is a direct source and electricity generation is an indirect source, they both are typically discussed under a heading of "Energy" when policies are put in place to reduce emissions. Therefore, this C-CAP discusses emissions with respect to the general source categories of Energy, Waste, Area Source and Transportation.

In this C-CAP, Business-As-Usual (BAU) refers to continued operations and development of the City without the inclusion of recently-adopted or proposed sustainability initiatives. The BAU scenario describes how emissions would be in year 2020, if the emissions inventory continued to grow strictly based upon the land use growth projections for the City and the naturally occurring events that might change the character of emissions. Therefore, BAU follows a predominantly linear growth pattern.

California Climate Action Registry, General Reporting Protocol version 3.1, January 2009

¹¹ Climate Action Reserve, Local Government Operations Protocol for the quantification and reporting of greenhouse gas emissions inventories 2008.pdf

¹² Climate Action Reserve, Urban Forestry Protocol, version 1.1, March 2010.

Transportation

ON-ROAD VEHICLES

Carbon dioxide emissions from vehicles were calculated utilizing EMFAC2007 emission factors for the existing and 2020 inventories. The Emission Factors (EMFAC) model was developed by CARB and used to calculate emission rates from on-road motor vehicles from light-duty passenger vehicles to heavy-duty trucks that operate on highways, freeways, and local roads in California. Motor vehicle emissions of CH_4 , and N_2O were also calculated using USEPA emission factors for on-road vehicles based on the total annual mileage driven multiplied by their respective emission factors by year.

Vehicle miles traveled (VMT) were determined by the City specific traffic forecaster, LSA Associates Inc., through a select-zone analysis for the City of Corona. This model estimates VMT for all trips that begin and/or end within the City limits. This accounts for traffic entering or exiting Corona and traffic within the City, but excludes pass-through traffic. Corona's VMT includes miles from all trips within Corona and half of the miles from trips that begin or end in Corona; Corona is held accountable for all trips within the city limits while the City shares accountability with other jurisdictions for trips that have only one end point in Corona. Each trip was assigned to a land use class (residential, commercial, or industrial) based upon the origin of the trip.

The estimates do not account for electrical, biodiesel (a blend of diesel and vegetable oil), or hydrogen powered systems. Any electrically powered vehicle which draws power from a residence, commercial or industrial land use will be accounted for in the electrical usage for the City. Predicted 2020 BAU vehicle trips were estimated by using predicted land use changes and growth. Costs associated with transportation were based on the diesel and gasoline fuel use and their associated per gallon costs in 2008.

AIRPORT USAGE

Corona operates a small airport that is only used for recreational purposes; there are no commercial or commuter flights into or out of the Corona Airport. The airport is managed by the City's Parks and Community Services Department. It is home to approximately 423 planes, and is an active airport with approximately 60,000 takeoffs and landings each year. The annual fuel use by these planes is included in the transportation emissions for Corona.



Energy

ELECTRICITY

The City emits CO₂, CH₄, and N₂O indirectly through the use of electricity provided by Southern California Edison (SCE) and the City's own Department of Water and Power; SCE and the City provided annual energy usage for 2008¹³. The City-provided electricity is purchased from the California Independent Systems Operator (CAISO) and delivered to City facilities as well as customers in new development areas. 2020 business as usual electricity use was estimated based on anticipated growth in the residential and commercial/industrial areas.



SCE and CAISO provide electricity from a variety of sources including natural gas, nuclear energy, large hydroelectric systems, and coal. Each of these sources of electricity emits different levels of GHGs. The annual usage in megawatt hours per year (MWh/year) was multiplied by the emission factors appropriate to the inventory year for CO_2 , CH_4 , and N_2O to determine emissions from these sources.

The City of Corona owns and operates the Clearwater Power Plant, which is a direct source of GHG emissions. The electricity produced by Clearwater is entirely from natural gas combustion. These emissions from electricity generation are included in the Energy section of this analysis.

Costs of electricity calculations were based on the annual kWh use and price per kWh for each rate class. Electricity rates fluctuate throughout the year, so average values were used.

CITY OF CORONA BASELINE MUNICIPAL ENERGY USE

Government operations make up less than 5% of the City's total emissions, but the City can set an example for residents by implementing reduction measures at the municipal level. Emissions from municipal operations are generated by energy and fuel use in City-owned facilities, buildings, and vehicles. In 2008, the City of Corona's municipal electricity use from SCE totaled 55,105,542 kWh. As part of the Community Energy Partnership among SCE, SCG, The Energy Coalition, and seven partner cities, Corona is working to monitor municipal energy use and implement energy efficiency measures that save money and reduce GHG emissions.

Table 2-1 outlines the City-owned facilities that receive electricity from SCE and have been identified to have: 1) the highest annual electricity usage (kWh), 2) highest costs, and 3) use the most electricity at a given moment within the year (Max kW). The Ranking columns order the facilities according to these three values; ranks range from 1 to 10 with 1 being the highest.

Southern California Edison. Electricity Use Report for City of Corona Year 2008, Version 5.0, March 15, 2010.

NATURAL GAS COMBUSTION

The City emits GHGs from the combustion of natural gas. The annual natural gas usage for the City in thousand cubic feet (Mcf) was converted to million British Thermal Units (MMBTUs) and multiplied by the respective emissions factors for CO_2 , CH_4 , and N_2O to determine the emissions from natural gas combustion, typically used for heating. Natural gas usage for 2008 was obtained from The Gas Company¹⁴. Anticipated 2020 natural gas data was based on the per unit usage in 2008 and the anticipated unit growth by 2020. The costs associated with natural gas use were calculated using California 2008 average rates obtained from the U.S. Energy Information Administration (EIA). The rates align with the use breakdowns of residential, industrial, and commercial use.

Table 2-1 City of Corona Municipal SCE Electricity Use							
					Ranking		
Facility Name	Address	Annual electricity cost	Annual kWh usage	Max kW	kWh	Cost	Max Kw
Corporation Yard Complex	730 Corporation Yard Way	\$623,399.07	14,521,430	2068.8	1	1	1
Lester Water Treatment Plant	2970 Rimpau	\$217,198.28	3,443,923	787.2	2	4	4
Historic Civic Center	815 W 6th St	\$218,173.65	3,239,525	791	3	3	3
Corporation Yard Complex	730 Corporation Yard Way	\$296,548.99	2,348,832	747.4	4	2	5
Santana Regional Park	598 Ontario Ave	\$102,606.03	2,291,472	320.2	5	5	8
Serfas Club Park	2575 Green River Rd	\$ 68,815.86	1,526,370	214.6	6		9
Well 8a DWP		\$ 70,285.09	1,379,613	170.9	7	9	
Well 15 DWP		\$ 54,399.20	1,068,318	130.3	8		
City Park, Pool, Scout House, Armory	930 E 6th St	\$ 54,519.26	1,035,747	168	9		
Well7a		\$ 43,730.09	989,002	125	10		
Border Park	2400 Avenida Del Vista	\$102,206.65	408,215	578.9		6	6
Mangular Park	2208 Mangular Ave	\$ 73,910.73	653,480	77.6		7	
Taylor Booster		\$ 73,195.89	544,912	200.6		8	10
City Library	650 S Main St	\$ 69,665.73	917,251	325.4		10	7
Well 12 DWP		\$ 54,471.51	376,080	893.2			2

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¹⁴ The Gas Company-Sempra Utilities, Oliver N. Harris March 10, 2010.

Area Source

LANDSCAPING

Emissions of CO_2 , CH_4 , and N_2O are generated by the use of landscape equipment through the combustion of gasoline. CO_2 emissions were determined directly through URBEMIS2007 for the existing and 2020 inventories. URBEMIS2007 is a computer software package that is used for modeling projected emissions of air quality pollutants including carbon dioxide. From the CO_2 emissions, the approximate number of gallons of gasoline consumed through landscape equipment use was calculated. This number was then multiplied by emission factors presented in the General Reporting Protocol, version 3.1^{15} to determine both CH_4 and N_2O emissions.

WOOD BURNING

Direct CO₂ emissions are produced from the burning of wood in wood stoves, fireplaces, and natural gas fired stoves. The emissions from natural gas fired stoves are included in the Energy source category. CO₂, CH₄, and N₂O emissions from wood stoves and fireplaces are calculated based on the percentage of residential units using each type of hearth and the estimated annual amount of wood burned. The emission coefficients used are taken from the USEPA's AP-42 document. Cost estimates were made for wood burning using the average cost of wood.

Water

POTABLE WATER

Electricity is needed to move and treat water. Corona residents and businesses currently use approximately 14 billion gallons of drinking water. The City's water system contains twenty-two wells, forty five booster pumps and sixteen reservoirs; 56 percent of that water is pumped from groundwater wells owned and operated by the City of Corona. Another 34 percent comes from the Colorado River by way of Lake Mathews. The final 10 percent is State Project water from Northern California, by way of the California Aqueduct. There are additional emissions associated with this purchased water from the Colorado River and the State Water Project due to the electricity used to transport the water over a long distance. Costs associated with water were based on the average rates for residential, commercial, and industrial customers.

WASTEWATER TREATMENT

Corona provides recycled water to the City by treating the wastewater in its three wastewater reclamation facilities. GHG emissions arise from the electricity used to pump and treat the water, the transportation fuel used to truck the biosolids to an off-site disposal area, and the direct methane

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¹⁵ California Climate Action Registry, General Reporting Protocol version 3.1, January 2009.

emissions from the anaerobic digesters used in the treatment process. The electricity and transportation emissions are included in their respective categories. The direct emissions are calculated based on the amount of methane gas produced by the anaerobic digester and the amount of biochemical oxygen demand (BOD) removed from the water.

Waste Management

SOLID WASTE

Emissions from solid waste are determined as the sum of emissions generated by transportation from its source to the landfill, the equipment used in its disposal at the landfill, fugitive emissions from decomposition in landfills, and the anthropogenic carbon sink generated by the incomplete decomposition of materials in the landfill.



Emissions from the transportation of solid waste is determined based on the annual lbs/year (pounds per year) of total waste

disposed in landfills including biosolids waste from wastewater treatment plants, the density of the waste, the capacity of the hauling trucks, the average number of miles traveled by each truck; and the CO_2 , CH_4 , and N_2O emissions generated per mile traveled.

Emissions from the equipment used at the landfills is calculated by determining the average hours of operation per day, the number of days of operation, and the emission factors for disposal equipment for CO_2 , CH_4 , and N_2O as determined from USEPA off-road mobile source emission factors. Landfill equipment emissions are only included in the inventory if the landfill is under the direct control of the City or County of interest. As the solid waste landfill El Sobrante used for the disposal of waste for Corona is not under the City's direct control, emissions from onsite equipment are not included in this inventory.

Fugitive emissions of methane from the decomposition of solid waste are calculated based on the annual waste generation multiplied by the USEPA emission factor for waste production for CH₄. The emission factor to determine CH₄ generation varies if the landfill operations are known to operate a methane flare or to generate electricity from methane capture. Carbon dioxide generated by decomposition of waste in landfills is not considered anthropogenic because it would be produced through the natural decomposition process regardless of its disposition in the landfill. Nitrous Oxide is not a bi-product of decomposition and therefore no fugitive emissions of nitrous oxide are anticipated from this source.

CHAPTER 2 METHODOLOGY

Anthropogenic carbon sinks are generated by the incomplete decomposition of waste in the landfill setting which results in the storage of carbon in the landfill 16 . Under natural conditions virtually all organic material degrades to CO_2 . Therefore, carbon stored in the landfill results in a reduction of CO_2 released as a bi-product of decomposition. The anthropogenic carbon sink is determined by the amount of waste generated multiplied by the USEPA emission factor.

Agriculture

FRUIT TREES

Corona has a very small amount of agriculture dominated by citrus and avocado production; the total acreage of agricultural land totals roughly 100 acres. Corona's agricultural emissions are primarily N_2O from leaching, fertilizer use, and soil management. These emissions were estimated using the USEPA's State Inventory Tool for Agriculture with emissions factors specific to fruit trees.



EPA 2006, Solid Waste Management and Greenhouse Gases: A Lifecycle Assessment of Emissions and Sinks, 3rd edition, September 2006.

Chapter 3 Greenhouse Gas Emissions Inventory

The emissions inventory identifies and categorizes the major sources and quantities of GHGs being produced by City residents, businesses, and municipal operations using the best available data. Using historic emissions and BAU practices as a basis, this C-CAP includes GHG emissions from 2008 and as predicted for 2020. 1990 emissions are estimated as a 15% reduction from 2008 levels in order to establish a reduction target for 2020.

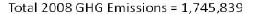
The Emissions Inventories are organized by Transportation, Energy, Area Sources, Water and Wastewater, Solid Waste, and Agriculture.

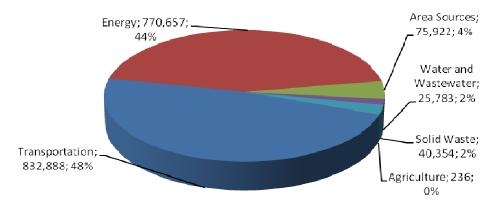
3.1 2008 Emissions Inventory

The City of Corona emitted approximately 1.7 MMT CO_2e in 2008. The emissions were calculated based on traffic modeling, data from utilities, and land use. The largest portion of the City's 2008 emissions were from transportation (48%), followed by emissions from electricity and natural gas use in buildings (44%). Table 3-1 summarizes the City's net 2008 emissions of CO_2e as broken down by emissions category. Figure 3-1 is a graphical representation of Table 3-1. A detailed breakdown of 2008 emissions by category is available in Appendix D.

Table 3-1 2008 Net Total Emissions				
Category	Metric tons of CO₂e			
Transportation	832,888			
Energy	770,657			
Area Sources	75,922			
Water and Wastewater	25,783			
Solid Waste	40,354			
Agriculture	236			
Total	1,745,839			

Figure 3-1 2008 Emissions Generated by Source (MT CO₂e)





2008 Cost Estimates

The costs associated with the existing inventory represent the consumer costs associated with energy, fuel, and water use. These cost estimates give the City the perspective on where residents are spending the most money and help to prioritize reduction measures toward the sectors that have the potential to both reduce emissions save the most money. Transportation was the largest source of emissions and cost in 2008, while energy use in buildings followed in emissions and cost. Table 3-3 below summarizes the cost estimates for 2008.

Table 3-2 2008 Cost	2008 Cost Estimates	
Category	Cost	
Transportation	\$388,984,511	
Energy	\$198,691,965	
Area Sources	\$55,279	
Water and Wastewater	\$30,594,535	
Total	\$618,326,290	

Reduction Target

AB 32 requires California to return to 1990 emissions levels by the year 2020; CARB has estimated this to be equivalent to a 15% reduction from existing emissions levels (CARB 2008). For the purposes of this C-CAP, the reduction target for Corona is determined based on a 15% reduction from the 2008 level. Table 3-3 below summarizes the 2008 emissions total and the 2020 reduction target. On a municipal level, the City would target an annual electricity savings of 8,265,831 kWh at their SCE serviced facilities in order to match these goals.

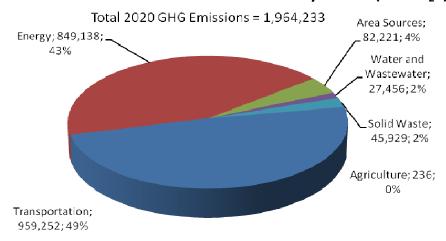
Table 3-3	2020 Reduction Target	
Category		Metric Tons of CO₂e
2008 Emissions		1,745,839
2020 Reduction Tar	get (15% below 2008)	1,483,963

3.2 2020 Business as Usual (BAU) Emissions Inventory

In 2020, Corona is projected to emit a total of 1.96 MMT CO₂e from a business-as-usual (BAU) standpoint. BAU refers to continued operations and development of the City according to 2008 policies, without the inclusion of proposed or recently-adopted sustainability initiatives described in Chapter 4. The 2020 BAU emissions are estimated based on the projected growth in Corona from 2008 to 2020. These projections include a 5.74% increase in housing and a 22.11% increase in employment; these two growth rates were applied, respectively, to residential and non-residential emissions in order to estimate 2020 BAU emissions. Table 3-4 summarizes the net 2020 City emissions of CO₂e as broken down by Emissions category. Figure 3-2 is a graphical representation of Table 3-4. A detailed breakdown of 2020 emissions by category is available in Appendix D.

Table 3-4 2020 BAU	Net Total Emissions
Category	Metric tons of CO₂e
Transportation	952,252
Energy	849,138
Area Sources	82,221
Water and Wastewater	27,456
Solid Waste	45,929
Agriculture	236
Total	1,964,233

Figure 3-2 2020 BAU Emissions Generated by Source (MT CO₂e)



Net Emissions Comparison by Year

The $2.0 \text{ MMT CO}_2\text{e}$ of GHG emissions for 2020 is an estimated increase of $218,394 \text{ MT CO}_2\text{e}$ above 2008 levels following BAU projections. The growth from 2008 to 2020 is a 12.5% increase, which is in line with estimates for California's projected emissions. Table 3-5 shows a comparison of net total emissions for 2008 and 2020 BAU emissions and the 2020 reduction target. Having one overall reduction target, as opposed to targets for each sector, allows Corona to have the flexibility to reduce emissions from the sector with the most cost-effective reduction strategies (i.e. the greatest reduction in emissions at the least cost).

Table 3-5 Net To	tal Emissions b	y Year
	Metric Tons CO₂e	
Source	2008	2020 BAU
Transportation	832,888	957,720
Energy	770,657	902,563
Area Sources	117,397	129,461
Water and Wastewater	25,783	27,070
Solid Waste	40,354	45,929
Agriculture	236	236
Total	1,745,839	1,964,233
2020 Reduction Target		1,483,963

CHAPTER 3 GREENHOUSE GAS EMISSIONS INVENTORY

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CITY OF CORONA 3-6 CLIMATE ACTION PLAN

Chapter 4 GHG Emissions Reduction Programs and Regulations

CHAPTER 4 GHG EMISSIONS REDUCTION PROGRAMS AND REGULATIONS



The State of California has set specific targets for reducing greenhouse gas emissions from the burning of fossil fuels in both power plants and vehicles by adopting various regulations. In addition, State energy efficiency and renewable requirements provide another level of reductions. In order to provide credit to Corona for regulatory actions already taken or planned by the State of California, this C-CAP first evaluates the greenhouse gas reductions that will occur within the City as a result of these actions. These will be identified in the C-CAP as R1 reduction measures. The R1 measures are included here to show all of the

anticipated reduction strategies identified in the AB 32 Scoping Plan for implementation at the State Level that will ultimately result in a reduction of greenhouse gas emissions at the City level. The R1 measures are not administered or enforced by the City, but the City - by describing them herein-substantiates the reductions associated with these State Measures.

R2 and R3 reduction measures are measures that will be incorporated at the City level to provide additional reductions in greenhouse gas emissions. R2 measures are those measures that can be quantified to show the value of the reduction from the incorporation of those measures. A complete list of assumptions and reductions for each of the R1 and R2 measures is included in Appendix E.

R3 measures are those measures that, although they provide a vehicle through which reductions in emissions will occur, cannot be quantified at this time. The R3 measures are supportive measures or methods of implementation for the R2 measures. For example, R3-E2: Energy Efficiency Training and Public education, is a measure that provides education to inform people of the programs, technology, and potential funding available to them to be more energy efficient, and provides the incentives to participate in the voluntary programs shown in R2-E1 through R2-E7. R3-E2 is supportive of measures R2-E1 through R2-E7 because it will provide more publicity, reduce the perceived challenge of being energy efficient, and provide information on potential rebates and other funding programs which will make retrofits more accessible to everyone. Therefore, although by itself R3-E2 cannot be quantified, its implementation provides a level of assurance that the reduction goals specified in the R2 measures will be achieved.

Also included in the R3 measures are reduction measures that reduce Corona's government operation emissions. Government operations make up less than 5% of the City's total emissions, but the City can set an example for residents by implementing reduction measures at the municipal level.

Over the last few years Corona has implemented several programs that have already begun to reduce the City's GHG emissions and will continue to provide reductions throughout the implementation of this C-CAP. Programs that were in place prior to 2008 are accounted for in the existing inventory while programs implemented since 2008 are included below as reduction measures used to reach the 2020 target.

The following discussion summarizes the existing Corona programs and the proposed reduction measures to be implemented by the City to further reduce GHG emissions. The reduction measures are organized herein by source category (transportation, energy, area source, water, solid waste, and agriculture) then by R1, R2, and R3 measure. The convention to be used for numbering the mitigation measures will be to list the R designation (R1, R2, or R3) then an abbreviation of the source category, followed by the order number. So, R1-E1 is the first R1 measure within the energy category, R1-E2 is the second measure within the energy category, and so on. The source category abbreviations are as follows: T – transportation; E – energy; L – area source; W – water; S - solid waste; and A - agriculture.

4.1 Existing Corona Programs

Transportation Management

The City of Corona has been working on vehicle trip and vehicle miles traveled (VMT) reduction strategies for over a decade. The result of this work has been a network of Transit Demand Management (TDM) Traffic Management System (TMS) programs, combined with a City-wide Bicycle Master Plan of linked bicycle lanes that link the Metrolink Station, downtown, and residential areas within the City. More recently, the City of Corona has emphasized mixed use development within infill areas near downtown and the Metrolink station with pedestrian linkages between land uses. The result of these efforts has been a drop in vehicle trips and VMT within the City. One problem faced by the City is the fact that the State Route (SR) 91, SR 71, and Interstate 15 freeways all converge in the City of Corona. So while City attributed vehicle trips and VMT have dropped, pass-through traffic continues to cause congestion on the freeways to the point that commuters get off the freeways in Corona to find shortcuts around the congestion on the local roadways. The City is reviewing ways to address the pass-through traffic problem within the City. While pass-through traffic remains a challenge, the City has had great success in reducing locally generated vehicle trips and VMT. The C-CAP will look at additional reduction strategies that build from these existing programs. The following summarizes some of the vehicle trip and VMT reducing strategies the City has implemented.

TRANSPORTATION DEMAND MANAGEMENT

The City of Corona, through its Municipal Code (Chapter 11.02)¹⁷, has established a Transportation Demand Management (TDM) program¹⁸ that requires large employers to offer programs to employees that reduce air pollution and ease traffic congestion. New, large employers are those which could employ one hundred or more employees based on the methodology outlined in Table 4-1.

Corona California, Municipal Codes, http://www.amlegal.com/nxt/gateway.dll/California/corona/coronacaliforniamunicipalcode?f=templates\$fn=default.htm\$3.0\$vid=amlegal:corona ca, accessed March 2010

¹⁸ City of Corona Advanced Transportation management system, adopted October 2002

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The Code states that new, large employers must incorporate facilities and/or programs in their development plans sufficient to attain a 12% work-related trip reduction from the expected number of trips related to the project

Table 4-1 TDM Land Use Category	
Land Use Category Gross Square Fee/employee	
Retail Commercial	500 square feet/employee
Office Professional	300 square feet/employee
Industrial/Manufacturing	500 square feet/employee
Warehouse	1,000 square feet/employee
Hotel/Motel	5 employee/guest room
Hospital	300 square feet/employee

Note: For mixed-use developments the project employment factor shall be based upon the proportion of the development devoted to each land use

The following is a list of programs that new employers may offer in order to comply with the code:

- Preferential parking for carpool vehicles.
- Bicycle parking and shower facilities.
- Information center for transportation alternatives.
- Rideshare vehicle loading areas.
- Vanpool vehicle accessibility.
- Bus stop improvements.
- On-site child care facilities.
- Local transportation systems management methods and road improvements.
- Facilities to encourage telecommuting.
- Contributions to support regional facilities designed to reduce vehicle trips and miles traveled.
- On-site amenities such as cafeterias and restaurants, automated teller machines, and other services that would eliminate the need for additional trips.

Additionally, all existing large, one hundred or more, employers must submit a trip reduction plan to the Public Works Director that outlines how to reduce work- related vehicle trips by 12%. The following trip reduction methods may be utilized to achieve the required vehicle trip reduction: alternative work schedules/flex time, telecommuting, bicycle and shower facilities, preferential parking, public transit incentive, minimizing peak hour truck travel, on-site child care, and any other method that can exhibit a reduction in vehicle trips.

ADVANCED TRAFFIC MANAGEMENT SYSTEM

The City of Corona utilizes an Advanced Traffic Management System (ATMS) to monitor street congestion and adjust traffic signals accordingly. ATMS is housed in the "Traffic Management Center" (TMC) which was designed and built with Corona City Hall in 2005. The project includes advanced traffic controllers, closed-circuit television (CCTV) surveillance cameras, video detection systems and system detectors to support ATMS. The project also includes a center to center interface between the City of Corona and Caltrans.

Phase 2 of the ATMS will expand the jurisdictional boundaries to integrate additional synchronized intersections owned and operated by Caltrans, implementation of Dynamic Message Signs (DMS) at key locations and a regional (multijurisdictional) incident management plan that will include trafficresponsive signal timing plans to encompass phase 1 and phase 2 signalized intersections¹⁹.

Bicycle Master Plan

The City of Corona Bicycle Master Plan was adopted in 2001²⁰. The plan describes the construction of 11.5 miles of Class I bike paths and 23 miles of Class II and Class III bikeways to build upon the existing 8 miles of bikeways. The bikeway facility types are described below:

Class I Bike Paths: Class I bike lanes are known as a bike path or multi-use trail. Bike paths are typically located along long uninterrupted corridors such as rivers, creeks, flood control channels, railroad rightsof-way, etc.

Class II Bike Lanes: Striped bicycle lanes located to the right of each direction of vehicle traffic along a roadway. Bike lanes are typically located along collector and arterial roadways that provide connections through the City street system.

Class III Bike Routes: Roadways that provide shared use with pedestrian or motor vehicle traffic and are identified only by bike route signing. Bike routes are typically along high demand corridors.

Before 2001, the Corona bikeway system had approximately 8 miles of Class I, Class II or Class III bike paths. A key benefit to the implementation of the Corona Bicycle Master Plan will be a reduction in traffic and improved air quality. Policies and infrastructure that improve bicycling conditions in Corona will result in more favorable traffic conditions and a reduction in greenhouse emissions that originate from cars. The City of Corona has posted bike routes on the City's website²¹ and updates when new routes are added.

http://www.discovercorona.com/index.cfm?section=City%20Departments&page=Public%20Works&cat=Publi c%20Services%20and%20Information, accessed June 2010.

CITY OF CORONA CLIMATE ACTION PLAN

City of Corona, Advanced Transportation Management System Phase II,

City of Corona, Corona Bicycle Master Plan May 31, 2001

City of Corona,

Green Building

In addition to following the 2007 California Building Code, the City of Corona has adopted a Green Building Ordinance (15.05.10 through 15.05.90). The purpose of this ordinance is consistent with the city's desire to create a more sustainable community. By adopting the ordinance homeowners, businesses, and building professionals may voluntarily incorporate green building measures into the design, construction, and maintenance of buildings and project development. The ordinance is designed to achieve the following:

- Encourage resource conservation;
- Reduce waste generated by construction projects;
- Increase energy efficiency; and
- Promote the health and productivity of residents, workers, and visitors of the city.

This ordinance is applicable to the construction of new buildings and reconstruction of buildings in which more than 50% of the existing building is demolished. Developers seeking the development to be designated as a Certified Green Building will apply to the City. The project is to achieve a minimum of twenty (20) credits on the LEED $^{\text{TM}}$ rating system.

Beginning in 2011, Corona will be enforcing the CALGreen Title 24 Green Building Standards. These statewide mandatory requirements replace the voluntary measures outlined in Corona's Green Building Ordinance.

Energy Efficiency

On June 15, 2010 the Corona City Council adopted Resolution No. 2010-05 to continue participation in the Community Energy Partnership program. Corona is one of 7 Partner Cities in the Community Energy Partnership – a collaboration with Southern California Edison, Southern California Gas Company, and The Energy Coalition. The mission of CEP is to build positive relationships among cities, energy consumers, and their serving utilities, and to educate communities about sustainable and efficient energy practices. The City of Corona has been an active member of the program since 2004.

Three core initiatives will guide the current program. These initiatives are common to all Local Government Partnerships within SCE and SCG territories, but are customized to meet each individual City's needs. The initiatives are:

- Energy Efficiency within Municipal Facilities
- Assistance with Strategic Plan Activities
- Utility Program Marketing, Education and Outreach (ME&O)

The Community Energy Partnership brings together all stakeholders within a City and Utilities to accomplish common goals. These stakeholders are brought together for regularly scheduled *Efficiency*

First! Team meetings where the program initiatives and progress towards energy saving programs are discussed.

The Community Energy Partnership is an energy efficiency program funded by California utility ratepayers and administered by Southern California Edison and Southern California Gas Company under the auspices of the California Public Utilities Commission.

Water Conservation

On January 7, 2009, in response to drought conditions in the State of California, the Corona City Council adopted Ordinance No. 2962. This ordinance establishes five stages of water conservation and drought response measures to be implemented by the city, with increasing restrictions on water use in response to decreasing water supplies and worsening drought conditions.

Section 13.26.040 of ordinance 2962 addresses water conservation and unreasonable uses of water. Unreasonable uses of water include:

- Allowing water to leave a person's property by drainage onto adjacent properties or public or private roadways or streets due to excessive irrigation and/or uncorrected leaks;
- Failing to repair a water leak; and
- Using water to wash down sidewalks, driveways, parking areas, tennis courts, patios or other paved areas, except to alleviate immediate safety or sanitation hazards.

The City Council must designate a water conservation stage for the City. Each stage (1-5) is determined by the degree of water availability to Corona and has specific regulations regarding water use. The five stages are briefly described in Table 4-2 below. Additionally, the City may declare a water shortage emergency during any water conservation stage.

Table	Table 4-2 Water Conservation Stages		
Stage Water Supply Status Water Conservation Requirements			
1	Normal Water Supply	Recommended conservation practices	
2	Minimum Water Shortage	Reduce usage by 10%	
3	Moderate Water Shortage	Reduce usage by 16% to 20%	
4	Severe Water Shortage	Reduce usage by 21% to 40%	
5	Critical Water Shortage	Reduce usage by more than 40%	

Due to the City's significant water shortage, the City of Corona City amended the Drought Ordinance on July 1, 2009 by adopting ordinance 2996. The 2996 ordinance limits landscape watering by assigning time, amount and days when landscape is allowed to use water.

Water Conservation and Landscape Requirements

In 2008 Corona adopted ordinance 2949 which revised the landscape requirements for water conservation for residential, commercial, and industrial development projects to reflect changes in state law. The ordinance was adopted to coincide with the adoption of the Landscape Design Guidelines for Commercial and Industrial Developments.

On February 22, 2010 the City adopted the revised Landscape Design Guidelines for Residential Development and revised Landscape Design Guidelines for Commercial and Industrial Developments. The guidelines were established to create a more pleasant living and working environment and promote water and resource conservation, including but not limited to, storm water retention/percolation and best management practices. The landscape design guidelines complement the mandatory site development regulations contained in the City's Zoning Ordinance and Specific Plans.

The guidelines will be utilized during the City's plan review process to accomplish the goals of ensuring highest level of resource conservation, promoting water-efficient landscaping, encouraging flexibility in design, complying with state guidelines for landscape water demand, and eliminating water waste.

Right of Way Landscaping

The City has implemented an Evapotranspiration (ET) Based Controller System that has a central irrigation system that is city-wide. At the time of this C-CAP, Corona has placed 26 miles of underground drip systems and six solar irrigation sites. The sites will automatically shut off water to a compromised area and send a notification for maintenance of the unit. Corona will be placing an additional three hundred eighty (380) electric meters throughout the City.

Recycled Water

On July 5, 2001, the City of Corona adopted the Recycled Water Master Plan to reduce dependency on local groundwater and imported water. The plan determined that the recycled water from Corona's three wastewater reclamation plants can cost-effectively be used for irrigation and groundwater recharge. A market analysis in the plan concluded that approximately 1,300 acres of golf courses, parks, landscape maintenance greenbelts, school grounds, freeway sites, and a cemetery could be irrigated with the recycled water.

The City has begun the implementation process and customers began receiving recycled water during the summer of 2006. The system produces approximately 6 million gallons of water per day, significantly reducing the city's dependence on potable water.

CITY OF CORONA 4-8 CLIMATE ACTION PLAN

Waste Reduction

The City of Corona offers education programs on green waste, appliance recycling, bottle & cans, motor oil, auto parts and e-waste. Corona offers pamphlets and on-line "Waste Prevention tips." Currently, 58% of Corona's 200,000 tons of waste produced annually is recycled. The City also works with Riverside County to offer household hazardous waste (HHW) collection to residents. There are two permanent HHW collection centers as well as mobile HHW events that are held regularly throughout Riverside County and are free to residents. The Corona City Corporate Yard host mobile HHW events periodically throughout the year.

City of Corona, http://www.discovercorona.com/index.cfm?section=City%20Departments&page=Public%20Works&cat=Refuse%20and%20Recycling, accessed May 2010.

4.2 Transportation

R1 Transportation Measures

The following list of R1 transportation related measures are those measures that California has identified in the AB 32 Scoping Plan that will result in emission reductions within the City.

R1-T1: ASSEMBLY BILL 1493: PAVLEY I

Assembly Bill (AB) 1493 (Pavley) required the California Air Resources Board (CARB) to adopt regulations that will reduce GHG from automobiles and light-duty trucks by 30 percent below 2002 levels by the year 2016, effective with 2009 models. By 2020, this requirement will reduce emissions in California by approximately 16.4 MMTCO₂e, representing 17.3 percent of emissions from passenger/light-duty vehicles in the State (CARB 2008). Implementation of Pavley I was delayed by the USEPA's denial of California's waiver request to set State standards that are more stringent than the federal standards, but in June 2009 the denial of the waiver was reversed and California was able to begin enforcing the Pavley requirements.

R1-T2: ASSEMBLY BILL 1493: PAVLEY II

California committed to further strengthening the AB1493 standards beginning in 2017 to obtain a 45 percent GHG reduction from 2020 model year vehicles. This requirement will reduce emissions in California by approximately 4.0 MMTCO₂e, representing 2.5 percent of emissions from passenger/light-duty vehicles in the State beyond the reductions from the Pavley I regulations described above (CARB 2008).

R1-T3: EXECUTIVE ORDER S-1-07 (LOW CARBON FUEL STANDARD)

The Low Carbon Fuel Standard (LCFS) will require a reduction of at least ten (10) percent in the carbon intensity of California's transportation fuels by 2020. By 2020, this requirement will reduce emissions in California by approximately 15 MMTCO₂e, representing 6.9 percent of emissions from passenger/light-duty vehicles in the State (CARB 2008). The emissions reduced by this strategy overlap with emissions as a result of the Pavley legislation; adding the emissions reductions would be an overestimate of the actual emissions reductions. This is accounted for in the emission reduction calculations following the methodology used by CARB to calculate emissions reductions in the AB 32 Scoping Plan.

R1-T4: TIRE PRESSURE PROGRAM

The AB 32 early action measure involves actions to ensure that vehicle tire pressure is maintained to manufacturer specifications. The State's plan for implementing this measure is directed at automotive service providers. CARB is requiring automotive service providers to check and inflate each vehicle's tires to the recommended tire pressure rating at the time of performing any automotive maintenance or repair service, indicate on the vehicle service invoice that a tired inflation service was completed and the tire pressure measurements after the services were performed, and keep a copy of the service invoice for a minimum of three years, and make the vehicle service invoice available to the ARB, or its

authorized representative upon request. By 2020, CARB estimates that this requirement will reduce emissions in California by approximately 0.55 MMTCO₂e, representing 0.3 percent of emissions from passenger/light-duty vehicles in the State (CARB 2008).

R1-T5: LOW ROLLING RESISTANCE TIRES

This AB 32 early action measure would increase vehicle efficiency by creating an energy efficiency standard for automobile tires to reduce rolling resistance. By 2020, this requirement will reduce emissions in California by approximately 0.3 MMTCO₂e, representing 0.2 percent of emissions from passenger/light-duty vehicles in the State (CARB 2008).

R1-T6: LOW FRICTION ENGINE OILS

This AB 32 early action measure would increase vehicle efficiency by mandating the use of engine oils that meet certain low friction specifications. By 2020, this requirement will reduce emissions in California by approximately 2.8 MMTCO₂e, representing 1.7 percent of emissions from passenger light-duty vehicles in the State (CARB 2008).

R1-T7: GOODS MOVEMENT EFFICIENCY MEASURES

This AB 32 early action measure targets system wide efficiency improvements in goods movement to achieve GHG reductions from reduced diesel combustion. By 2020, this requirement will reduce emissions in California by approximately 3.5 MMTCO₂e, representing 1.6 Percent of emissions from all mobile sources (on-road and off-road) in the State (CARB 2008).

R1-T8: HEAVY-DUTY VEHICLE GHG EMISSION REDUCTION (AERODYNAMIC EFFICIENCY)

This AB 32 early action measure would increase heavy-duty vehicle (long-haul trucks) efficiency by requiring installation of best available technology and/or CARB approved technology to reduce aerodynamic drag and rolling resistance. By 2020, this requirement will reduce emissions in California by approximately 0.93 MMTCO₂e, representing 1.9 percent of emissions from heavy-duty vehicles in the State (CARB 2008).

R1-T9: MEDIUM AND HEAVY-DUTY VEHICLE HYBRIDIZATION

The implementation approach for this AB 32 measure is to adopt a regulation and/or incentive program that reduce the GHG emissions of new trucks (parcel delivery trucks and vans, utility trucks, garbage trucks, transit buses, and other vocational work trucks) sold in California by replacing them with hybrids. By 2020, this requirement will reduce emissions in California by approximately $0.5\,$ MMTCO₂e, representing $0.2\,$ percent of emissions from all on-road mobile sources in the State. This reduction is also equivalent to a $1.0\,$ percent reduction of emissions from all heavy-duty trucks in the State (CARB 2008).

R2 Transportation Measures

The following list of R2 measures are measures the City can implement to achieve an AB 32 compliant reduction target.

R2-T1: LAND USE BASED TRIPS AND VMT REDUCTION POLICIES

This measure complements the City's existing Transportation Demand Management (TDM) program to achieve greater vehicle trip and VMT reductions.

The demand for transportation is influenced by the density and geographic distribution of people and places. Whether neighborhoods have sidewalks or bike paths, whether homes are within walking distance of shops or transit stops will influence the type and amount of transportation that is utilized. By changing the focus of land use from automobile centered transportation, a reduction in vehicle miles traveled will occur. Opportunities include a ½ mile radius around the Metrolink Station, mixed use development within the growth



areas of the City, and infill development within downtown Corona. See Appendix E for detailed emissions reduction calculations for this strategy and all of the reduction strategies.

R2-T2: RESIDENTIAL PERMIT PARKING

Residential Permit Parking is an existing City program that allows residents of qualified neighborhoods to obtain special permits that exempt them and their guests from certain on-street parking time limits or prohibitions in their areas.²³ Anticipated reductions from this measure come from the future qualified neighborhoods that will become part of the program. The neighborhood must meet the following eligibility requirements:

- Area must be located within a Preferential Parking District. Preferential parking districts are created by the City Council for areas with potential traffic parking intrusion, near some schools, and parks.
- 67% of the area's residents must request the program.
- 80% of on-street parking spaces in the area must by occupied during peak parking periods, or out of area traffic is causing public nuisance.
- The area's boundaries are such that designating it for preferential parking will not shift the parking problem to an adjacent area.

²³ City of Corona Public Works, Public Parking Information http://www.discovercorona.com/index.cfm?section=City%20Departments&page=Public%20Works&cat=Public%20Facility%20Maintenance&viewpost=2&ContentId=132

R2-T3: BICYCLE MASTER PLAN

Corona's Bicycle Master Plan is extensive and describes the construction on 11.5 miles of Class I bike paths and 23 miles of Class II and Class III bikeways to build upon the current 8 miles of bikeways (Corona 2001). This measure continues the construction of implementation of the bicycle infrastructure within Corona's Bicycle Master Plan in order to continue to divert local commutes away from vehicles. The reduction associated with bicycle infrastructure was calculated following CAPCOA's methodology and are based on the increased miles of bike paths and bikeways.

R2-T4: WRCOG NEIGHBORHOOD ELECTRIC VEHICLE PLAN

Implementation of the WRCOG's Neighborhood Electric Vehicle (NEV) Plan has the potential to decrease VMT from traditional passenger vehicles by encouraging the replacements of trips in passenger vehicles with trips in electric vehicles (WRCOG 2010). A conservative estimate for adoption of NEVs by residents is 4%. Each household with an NEV replaces, on average, 12.7% of traditional passenger vehicle trips with electric vehicle trips (CAPCOA 2010). This equates to a 0.5% reduction in VMT community-wide.

R3 Transportation Measures

The following R3 measures enhance and/or ensure the reductions accounted for within the R2 measures through education programs or are measures that will reduce emissions but cannot be quantified. Also, reduction measures implemented at the municipal level are described.

R3-T1: REGIONAL LAND USE AND TRANSPORTATION COORDINATION

Promoting the development and use of transit between Corona and other jurisdictions including the County and neighboring cities enhances the implementation of R2-T1 and R2-T4 described above.

R3-T2: CITY OF CORONA EMPLOYEE RIDESHARE

In order to cut down on transportation emissions and commute costs, the City has organized carpools and vanpools for its municipal employees that share similar commutes. Currently there are 9 active vanpools with a daily participation of 21 employees. This measure supports rideshare programs for all employers in the City by providing an example of a successful rideshare program.

R3-T3: MUNICIPAL FLEET ALTERNATIVE VEHICLES

Corona's municipal fleet consists of over 400 vehicles ranging from small passenger cars to dump trucks and fire engines. In an effort to save on fuel costs and reduce air pollution and greenhouse gas emissions, the City has 33 fleet vehicles that are powered on compressed natural gas (CNG). As older vehicles retire, the new replacement vehicles will continue to increase the fuel efficiency of the municipal fleet. The City's use of fuel efficient and alternative fuel vehicles helps to promote their use by local residents.

4.3 Energy

R1 Energy Reduction Measures

The following list of R1 building energy efficiency related measures are those measures that California has identified in the AB 32 Scoping Plan that will result in emission reductions within the City.

R1-E1: RENEWABLE PORTFOLIO STANDARD FOR BUILDING ENERGY USE

Senate Bills (SBs) 1075 (2002) and 107 (2006) created the State's Renewable Portfolio Standard (RPS), with an initial goal of 20 percent renewable energy production by 2010. Executive Order (EO) S-14-08 establishes a RPS target of 33 percent by the year 2020 and requires State agencies to take all appropriate actions to ensure the target is met. In April 2011, Governor Jerry Brown signed Senate Bill 2 (2011), which codified the Executive Order and requires the State to reach the 2020 goal (CARB 2008).

R1-E2 AND R1-E3: AB 1109 ENERGY EFFICIENCY STANDARDS FOR LIGHTING (RESIDENTIAL AND COMMERCIAL INDOOR AND OUTDOOR LIGHTING)

Assembly Bill (AB 1109) mandated that the California Energy Commission (CEC) on or before December 31, 2008, adopt energy efficiency standards for general purpose lighting. These regulations, combined with other State efforts, shall be structured to reduce State-wide electricity consumption in the following ways:

- R1-E2: At least 50 percent reduction from 2007 levels for indoor residential lighting by 2018; and
- R1-E3: At least 25 percent reduction from 2007 levels for indoor commercial and outdoor lighting by 2018 (CARB 2008).

R1-E4: ELECTRICITY ENERGY EFFICIENCY (AB32)

This measure captures the emission reductions associated with electricity energy efficiency activities included in CARB's AB32 Scoping Plan that are not attributed to other R1 or R2 reductions, as described in this report. This measure includes energy efficiency measures that CARB views as crucial to meeting the State-wide 2020 target, and will result in additional emissions reductions beyond those already accounted for in California's Energy Efficiency Standards for Residential and Non-Residential Buildings (Title 24, Part 6 of the California Code of Regulations; hereinafter referred to as, "Title 24 Energy Efficiency Standards") of California's Green Building Standards Code (Title 24, Part 11 of the California Code of Regulations; hereinafter referred to as "CALGreen").



By 2020, this requirement will reduce emissions in California by approximately 21.3 MMTCO2e, representing 17.5 percent of emissions from all electricity in the State (CARB 2008). This measure includes the following strategies:

- "Zero Net Energy" buildings (buildings that combine energy efficiency and renewable generation so that they, based on an annual average, extract no energy from the grid);
- Broader standards for new types of appliances and for water efficiency;
- Improved compliance and enforcement of existing standards;
- Voluntary efficiency and green building targets beyond mandatory codes;
- Voluntary and mandatory whole-building retrofits for existing buildings;
- Innovative financing to overcome first-cost and split incentives for energy efficiency, on-site renewables, and high efficiency distributed generation;
- More aggressive utility programs to achieve long-term savings;
- Water system and water use efficiency and conservation measures;
- Additional industrial and agricultural efficiency initiatives; and
- Providing real time energy information technologies to help consumers conserve and optimize energy performance.

R1-E5: NATURAL GAS ENERGY EFFICIENCY (AB32)

This measure captures the emission reductions associated with natural gas energy efficiency activities included in CARB's AB32 Scoping Plan that are not attributed to other R1 or R2 reductions, as described in this report. This measure includes energy efficiency measures that CARB views as crucial to meeting the State-wide 2020 target, and will result in additional emissions reductions beyond those already accounted for in the Title 24 Energy Efficiency Standards or CALGreen. By 2020, this requirement will reduce emissions in California by approximately 4.3 MMTCO2e, representing 6.2 percent of emissions from all natural gas combustion in the State (CARB 2008). This measure includes the following strategies:

- "Zero Net Energy" buildings (buildings that combine energy efficiency and renewable generation so that they, based on an annual average, extract no energy from the grid);
- Broader standards for new types of appliances and for water efficiency;
- Improved compliance and enforcement of existing standards;
- Voluntary efficiency and green building targets beyond mandatory codes;
- Voluntary and mandatory whole-building retrofits for existing buildings;
- Innovative financing to overcome first-cost and split incentives for energy efficiency, on-site renewables, and high efficiency distributed generation;
- More aggressive utility programs to achieve long-term savings;

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- Water system and water use efficiency and conservation measures;
- Additional industrial and agricultural efficiency initiatives; and
- Providing real time energy information technologies to help consumers conserve and optimize energy performance.

R1-E6: INCREASED COMBINED HEAT AND POWER (AB32)

This measure captures the reduction in building electricity emissions associated with the increase of combined heat and power activities, as outlined in CARB's AB 32 Scoping Plan. The Scoping Plan suggests that increased combined heat and power systems, which capture "waste heat" produced during power generation for local use, will offset 30,000 GWh State-wide in 2020. Approaches to lowering market barriers include utility-provided incentive payments, a possible CHP portfolio standard, transmission and distribution support systems, or the use of feed-in tariffs. By 2020, this requirement will reduce emissions in California by approximately 6.7 MMTCO₂e, representing 7.6 percent of emissions from all electricity in the State (CARB 2008).

R1-E7: INDUSTRIAL EFFICIENCY MEASURES (AB32)

This measure captures the reduction in industrial building energy emissions associated with the energy efficiency measures for industrial sources included in CARB's AB 32 Scoping Plan. By 2020, this requirement will reduce emissions in California by approximately 1.0 MMTCO₂e, representing 3.9 percent of emissions from all industrial natural gas combustion in the State (CARB 2008). CARB proposes the following possible State-wide measures:

- Oil and gas extraction regulations and programs to reduce fugitive CH₄ emissions;
- GHG leak reduction from oil and gas transmission;
- Refinery flare recovery process improvements; and
- Removal of methane exemption from existing refinery regulations.

R2 Energy Reduction Measures

The following list of R2 measures are candidate measures related to building energy efficiency the City can implement to achieve an AB 32 compliant reduction target.

R2-E1: NEW CONSTRUCTION RESIDENTIAL ENERGY EFFICIENCY REQUIREMENTS

This measure facilitates the implementation of energy efficient design for all new residential buildings to be 20% beyond the current Title 24 Standards. This energy efficiency requirement is equal to that of the LEED for Homes and ENERGY STAR programs.

The 2008 Title 24 Energy Standards were adopted by the Energy Commission on April 23, 2008, with the 2008 Residential Compliance Manual adopted by the Commission on December 17, 2008. Compliance with the 2008 standards went into effect January 1, 2010. In an effort to meet the overall goal of the

California Energy Efficiency Strategic Plan of reaching zero net energy for residential buildings by 2020, the stringency of the Title 24 Energy Standards as regulated and required by the State will continue to increase every three years. As energy efficiency standards increase Corona may want to periodically reevaluate their percentage beyond Title 24 goal to ensure it is still a feasibly achievable goal.

The City would provide all developers with a list of potentially feasible GHG reduction measures that reflect the current state of the regulatory environment prior to design development. The developer will then submit to the City a mitigation report demonstrating which of the proposed reduction measures are feasible as well as why the unselected measures are infeasible. The Screening Table provided in Appendix F of this CAP includes a menu of options with points assigned to them. As long as a developer meets the required point allotment (100 points) the developer will meet the requirements of this measure. This system will assure flexibility in the implementation of this reduction measure. Although not limited to these actions, this reduction goal can be achieved through the incorporation of the following:

- Install energy efficient appliances, including air conditioning and heating units, dishwashers, water heaters, etc;
- Install solar water heaters;
- Install top quality windows and insulation;
- Install energy efficient lighting;
- Optimize conditions for natural heating, cooling and lighting by building siting and orientation;
- Use features that incorporate natural ventilation;
- Install light-colored "cool" pavements, and strategically located shade trees along all bicycle and pedestrian routes; and
- Incorporate skylights; reflective surfaces, and natural shading in building design and layouts.

R2-E2: NEW CONSTRUCTION RESIDENTIAL RENEWABLE ENERGY

This measure facilitates the voluntary incorporation of renewable energy (such as photovoltaic panels) into new residential developments. For participating developments, renewable energy application should be such that the new home's projected energy use from the grid is reduced by 50%. The California Energy Commissions' New Solar Homes Partnership is a component of the California Solar Initiative and provides rebates to developers of 6 or more units where 50% of the units include solar power. In addition this measure would encourage that all residents be equipped with "solar ready" features where feasible, to encourage future installation of solar energy systems. These features should include the proper solar orientation (south facing roof sloped at 200 to 550 from the horizontal), clear access on south sloped roofs, electrical conduit installed for solar electric system wiring, plumbing installed for solar hot water systems, and space provided for a solar hot water tank. The incentive program should provide enough funding and other incentives as shown in the R3 measures to result in approximately fifty percent of new residential development participation in this program, thereby resulting in a 25% reduction in electrical consumption from new residential developments.

As an alternative to, or in support of, providing onsite renewable energy, the project proponent can buy into a purchased energy offset program that will allow for the purchase of electricity generated from renewable energy resources offsite. The purchased energy offsets must come from a registered project of the Climate Action Reserve. The Climate Action Reserve ensures the environmental integrity of GHG emissions reduction projects for use in the U.S. carbon markets. Purchased energy offsets (or a combination of incorporated renewables and purchased offsets) must be equal to 25% of the total projected energy consumption for the development. See R3-E3 for further details on the financing program.

R2-E3: RESIDENTIAL ENERGY EFFICIENCY RETROFITS

This reduction measure sets a goal for the City to increase energy efficiency in existing homes. The reductions calculated assume that 20% of home will participate and each home will be able to reduce energy consumption by 15%. There are a variety of financial incentives and programs to assist homeowners that make the implementation of these goals feasible (see Chapter 7: Implementation of this report for details). One key program ensuring the achievement of this reduction measures is Corona's partnership with the Western Riverside Council of Governments (WRCOG) surrounding their Energy Efficiency and Water Conservation Program (WRCOG 2009). The program would provide residences with low-interest loans that can be used to implement energy efficient improvements on their homes. This program has the potential to reduce energy consumption in retrofitted homes by a minimum of 15%. Additionally, the screening tables for new development include an option for developers to earn point by contributing toward the energy efficiency retrofits of existing homes (see Appendix F). Although not limited to these actions, this reduction goal can be achieved through the incorporation of the following:

- Replace inefficient air conditioning and heating units with new energy efficient models;
- Replace older, inefficient appliances with new energy efficient models;
- Replace old windows and insulation with top-quality windows and insulation;
- Install solar water heaters;
- Replace inefficient and incandescent lighting with energy efficient lighting; and
- Weatherize the existing building to increase energy efficiency.

R2-E4: RESIDENTIAL RENEWABLE ENERGY RETROFITS

This measure sets a goal for City residents to retrofit their homes with photovoltaic panels such that 50% of all of the home's electrical usage is from renewable energy. The emissions reductions calculated for this measure assume that 20% of existing home will participate. The 20% participation depends on the financial incentives and programs described in Chapter 7: Implementation of this report. In particular, the California Energy Commission's Solar Initiative has incentives available to home owners. In addition, WRCOG's Energy Efficiency and Water Conservation Program helps finance solar photovoltaic systems for residents. As with R2-E3, developers will be able to earn points in the screening table by contributing to renewable energy retrofits for existing homes.

R2-E5: NEW CONSTRUCTION COMMERCIAL ENERGY EFFICIENCY REQUIREMENTS

This measure facilitates the implementation of energy efficient design for all new commercial buildings to be 20% beyond the current Title 24 Standards. This energy efficiency requirement is 10% greater than the minimum requirements of the LEED and ENERGY STAR programs. As energy efficiency standards increase the City may want to periodically re-evaluate their percentage beyond Title 24 goal to ensure it is still a feasibly achievable goal.

As described in R2-E1 above, the City would provide all developers with a list of potentially feasible GHG reduction measures that reflect the current state of the regulatory environment. The City will develop a menu of options with points assigned to them. As long as a developer meets the required point allotment (100 points) the developer will meet the requirements of this measure. This system will provide flexibility in the implementation of this reduction measure. Although not limited to these actions, this reduction goal can be achieved through the incorporation of the following:

- Install energy efficient appliances, including air conditioning and heating units, dishwashers, water heaters, etc.;
- Install solar water heaters;
- Install top quality windows and insulation;
- Install energy efficient lighting;
- Optimize conditions for natural heating, cooling and lighting by building siting and orientation;
- Use features that incorporate natural ventilation;
- Install light-colored "cool" pavements, and strategically located shade trees along all bicycle and pedestrian routes; and
- Incorporate skylights; reflective surfaces, and natural shading in building design and layouts.

R2-E6: NEW CONSTRUCTION COMMERCIAL/INDUSTRIAL RENEWABLE ENERGY

This measure would facilitate the voluntary incorporation of renewable (solar or other renewable) energy generation into the design and construction of new commercial, office, and industrial developments. Renewable energy generation shall be incorporated such that a minimum of 20% of the project's total energy needs are offset. In addition this measure would encourage all facilities be equipped with "solar ready" features where feasible, to facilitate future installation of solar energy systems. These features should include the proper solar orientation (south facing roof sloped at 20° to 55° from the horizontal), clear access on south sloped roofs, electrical conduit installed for solar electric system wiring, plumbing installed for solar hot water systems, and space provided for a solar hot water tank.

As an alternative to, or in support of, providing onsite renewable energy, the project proponent can buy into an offset program that will allow for the purchase of renewable energy resources offsite.

Purchased energy offsets (or a combination of incorporated renewables and purchased offsets) must be equal 20% of the total projected energy consumption for the development. See R3-E3 for further details on the financing program.

R2-E7: COMMERCIAL/INDUSTRIAL ENERGY EFFICIENCY AND RENEWABLE ENERGY RETROFITS

This measure sets a goal for all commercial or industrial buildings undergoing major renovations to reduce their energy consumption by a minimum of 20%. The emissions calculations assume that by 2020, 25% of commercial or industrial buildings will have reduced their energy consumption by 20% through energy efficiency and renewable energy retrofits. The State offers incentives and programs that contribute toward the implementation of this goal (See Chapter 7: Implementation). Similar to the residential goals described above, WRCOG's Energy Efficiency and Water Conservation Program could help finance energy efficiency and renewable energy projects for commercial buildings. New developers can also earn points in the screening table document by contributing to energy efficiency or renewable energy projects for existing commercial buildings. Although not limited to these actions, this reduction goal can be achieved through the incorporation of the following:

- Replace inefficient air conditioning and heating units with new energy efficient models;
- Replace older, inefficient appliances with new energy efficient models;
- Replace old windows and insulation with top-quality windows and insulation;
- Install solar water heaters;
- Replace inefficient and incandescent lighting with energy efficient lighting; and
- Weatherize the existing building to increase energy efficiency.

R2-E8: INDUCTION STREETLIGHT RETROFITS

Corona Department of Public Works maintains 12,265 street and safety lights city-wide. With the aid of the Energy Efficiency and Conservation Block Grant (EECBG) funds, the City will replace approximately 16% or 1,920 of the existing standard High Pressure Sodium (HPS) lamps with Induction Lighting. The new lamps are estimated to last 5 times longer and consume 50% less energy than the HPS lamps.

R2-E9: SOLAR POWER FOR WATER RECLAMATION FACILITY #1

In addition to the induction streetlight retrofits, the City plans to utilize funds from the EECBG to increase the number of solar panels at their Water Reclamation Facility #1. The City Department of Water and Power (DWP) is investing \$1 million into the project which will be combined with the \$727,100 from EECBG. This will help reduce the energy load of the facility by an estimated 572,000 kWh annually.

R2-E10: ADDITIONAL ENERGY EFFICIENCY RETROFIT PROJECTS

The Community Energy Partnership assists the City in tracking future energy efficiency projects. Additional projects will be identified through the resources of the program and discussed with City team members and other Community Energy Partnership Partners. As of December 2010 this list includes:

- 13 wells have are scheduled for pump optimization upgrades to improve their efficiency. These projects are projected to save the City 2.45 million kWh annually.
- The Corona City Hall is in the process of upgrading their cooling systems and is estimated to save the City over 300,000 kWh once the retrofits are completed.
- In addition to the first phase of induction street light retrofits, the City anticipates changing out the remaining street lights over four total phases to save the City over 4 million kWh annually.

The City's current list of municipal project will achieve approximately 6,906,447 annual kWh savings. This is 84% of their C-CAP goals towards municipal energy savings. City staff will continue to work with the Community Energy Partnership to identify and implement additional energy saving retrofit projects over the coming years.

R3 Energy Reduction Measures

The following R3 measures enhance and/or ensure the reductions accounted for within the R2 measures through education programs or are measures that will reduce emissions but cannot be quantified.

R3-E1: ENERGY EFFICIENT DEVELOPMENT, AND RENEWABLE ENERGY DEPLOYMENT FACILITATION AND STREAMLINING

This measure would encourage the City to identify and remove any regulatory and procedural barriers to the implementation of green building practices and the incorporation of renewable energy systems. This could include the updating of codes and zoning requirements and guidelines. This measure could be further enhanced by providing incentives for energy efficient projects such as priority in the reviewing, permitting, and inspection process. Additional incentives could include flexibility in building requirements such as height limits or set-backs in exchange for incorporating green building practices or renewable energy systems.

R3-E2: ENERGY EFFICIENCY TRAINING & PUBLIC EDUCATION

This measure would strengthen Corona General Plan Policy Infrastructure & Utilities 7.6.8 which provides public education and publicity about energy efficiency measures and reduction programs available within the City through a variety of methods including newsletters, brochures, and the City's Website. This measure would enhance this existing program by including rebates and incentives available for residences and businesses as well as providing training in green building materials, techniques, and practices for all plan review and building inspection staff.

R3-E3: ENERGY EFFICIENCY AND SOLAR ENERGY FINANCING

This measure would facilitate the incorporation of innovative, grant funded or low-interest financing programs for energy efficiency and renewable energy projects for both existing and new developments. This would include financing for heating, ventilation, air conditioning, lighting, water heating equipment, insulation, weatherization, and residential and commercial renewable energy. The City is a member of a partnership with WRCOG surrounding their Energy Efficiency and Water Conservation Program. The program would provide property with low-interest loans that would be repaid over time through annual property tax payments.

R3-E4: CROSS-JURISDICTIONAL COORDINATION

Under this reduction measure the City would coordinate with other local governments, special districts, nonprofit, and other organizations in order to optimize energy efficiency and renewable resource development and usage. This would allow for economies of scale and shared resources to more effectively implement these environmental enhancements.

R3-E5: ALTERNATIVE ENERGY DEVELOPMENT PLAN

The accomplishment of this measure would encourage the City to work with SCE to explore the possibilities for producing energy by renewable means within the built environment. This would be developed to identify appropriate alternative energy facilities (i.e., photovoltaic) for use within residential and commercial developments. The Alternative Energy Development Plan will encourage the establishment of City policies and ordinances to address how alternative energy production would be conducted. This measure would identify the most optimal locations and the best means by which to avoid noise, aesthetics and other land use compatibility conflicts. Another provision of this Plan could be to identify possible sites for the production of renewable energy using local renewable sources such as solar, wind, small hydro, and/or biogas. This would encourage adopting measures to protect these resources and providing right-of-way easements, utility easements, or by setting aside land for future development of these potential production sites.

4.4 Area Source

The following list includes measures related to landscaping and wood burning emissions that will reduce emissions and help the City to achieve an AB 32 compliant reduction target.

R1 Area Source Reduction Measures

R1-L1: SCAQMD HEALTHY HEARTHS PROGRAM

AQMD's Rule 445-Wood Burning Devices, adopted on March 7, 2008, applies to residents in the South Coast Air Basin and includes the following key components:

No permanently installed indoor or outdoor wood burning devices in new developments;

■ Establishes a mandatory wood burning curtailment program on high pollution days during November through February, beginning November 1, 2011. Based on current air quality conditions, there may be 10 to 25 mandatory curtailment days in specific areas (AQMD 2008).

R3 Area Source Reduction Measures

The following R3 measures are related to landscape strategies that will help reduce greenhouse gas emissions and can be incorporated into development projects without additional cost. These measures strategically place trees and other landscape mechanisms that create shade to reduce the heat island effect within parking lots and adjacent to buildings, which in turn, reduces the temperature of buildings and cars during the summer.

R3-L1: EXPAND CITY TREE PLANTING

This program evaluates the feasibility of expanding tree planting within the City. This includes the evaluation of potential carbon sequestration from different tree species, potential reductions of building energy use from shading, and GHG emissions associated with pumping water used for irrigation. Commercial and retail development should be encouraged to exceed shading requirements by a minimum of 10% and to plant low emission trees. In support of Environmental Resources Goal 10.10 from Corona's General Plan, all future development shall be encouraged to preserve native trees and vegetation to the furthest extent possible.

R3-L2: HEAT ISLAND PLAN

The implementation of this measure would include promoting the use of cool roofs, cool pavements, and parking lot shading to the entire City and expanding upon Corona's General Plan Community Design Policy 2.1.1 by increasing the number of strategically placed shade trees. Further, City wide Design Guidelines should be amended to include that all new developments and major renovations (additions of 25,000 square feet or more) would be encouraged to incorporate the following strategies such that heat gain would be reduced for 50% of the non-roof impervious site landscape (including parking, roads, sidewalks, courtyards, and driveways). The strategies include:

- Strategically placed shade trees;
- Paving materials with a Solar Reflective Index (SRI) of at least 29;
- Open grid pavement system; or
- Covered parking (with shade or cover having an SRI of at least 29).

4.5 Water

R1 Water Reduction Measure

The following R1 water related reduction measure has been identified in the AB 32 Scoping Plan and will result in emission reductions within the City.

R1-W1: RENEWABLE PORTFOLIO STANDARD (33 PERCENT BY 2020) RELATED TO WATER SUPPLY AND CONVEYANCE

This measure would increase electricity production from eligible renewable power sources to 33 percent by 2020. A reduction in GHG emissions results from replacing natural gas-fired electricity production with zero GHG-emitting renewable sources of power. By 2020, this requirement will reduce emissions from electricity used for water supply and conveyance in California by approximately 21.3 MMTCO₂e, representing 15.2 percent of emissions from electricity generation (in-State and imports) (CARB 2008).

R2 Water Reduction Measure

The following R2 measure is a candidate measure related to water that the City can implement to achieve an AB 32 compliant reduction target.

R2-W1: WATER USE REDUCTION INITIATIVE

This initiative would reduce emissions associated with electricity consumption for water treatment and conveyance. This measure encourages the City to adopt a per capita water use reduction goal in support of the Governors Executive Order S-14-08 which mandates the reduction of water use of 20 percent per capita. The City's adoption of a water use reduction goal would introduce requirements for new development and would provide cooperative support for water purveyors that are required to implement these reductions for existing developments. The City would also provide internal reduction measures such that City facilities will support this reduction requirement. The following represent potential programs that can be implemented to attain this reduction goal.

WATER CONSERVATION PROGRAM

Under this program the excessive watering of landscaping, excessive fountain operation, watering during peak daylight hours, water of non-permeable surfaces, excessive water use for noncommercial washing, and water use resulting in flooding or runoff would be prohibited. In addition the program would encourage efficient water use for construction activities, the installation of low-flow toilets and showerheads for all new developments, use of drought-tolerant plants with efficient landscape watering systems for all new developments, recycling of water used for cooling systems, use of pool covers, and the posting of water conservation signage at all hotels.

NEW DEVELOPMENT INCENTIVES

Provide incentives for developers to comply with the California Green Building Standards Code as requirements for all new development. Under this Code new developments are required to reduce

indoor potable water use by 20% beyond the Energy Policy Act of 1992 fixture performance requirements, and to reduce outdoor potable water use by 50% from a mid-summer baseline average consumption through irrigation efficiency, native plant selection, the use of recycled water and/or captured rainwater for example.

WATER EFFICIENCY RETROFIT PROGRAM

This program would encourage upgrades in water efficiency for renovations or additions of residential, commercial, office, and industrial properties equivalent to that of new developments. The City would work with local water purveyors to achieve consistent standards, and to develop, approve, and review procedures for implementation.

INCREASED RECYCLED WATER USE

Promote the use of municipal wastewater and graywater for agricultural, industrial and irrigation purposes. This measure would be subject to approval of the State Health Department and compliance with Title 22 provisions. This measure would facilitate the following:

- Inventory of non-potable water uses that could be substituted with recycled or graywater;
- Determination of the feasibility of producing and distributing recycled water for groundwater replenishment;
- Determine the associated energy/GHG tradeoffs for treatment/use vs. out of basin water supply usage;
- Cooperation and coordination with responsible agencies to encourage the use of recycled water where energy tradeoffs are favorable.

R3 Water Reduction Measure

The following R3 measure enhances and/or ensures the reductions accounted for within the R2 measure identified above.

R3-W1: WATER EFFICIENCY TRAINING AND EDUCATION

Under this measure the City, in coordination with local water purveyors would implement a public information and education program that promotes water conservation. The program could include certification programs for irrigation designers, installers, and managers, as well as classes to promote the use of drought tolerant, native species and xeriscaping. This measure supports measure R2-W1 discussed above.

4.6 Solid Waste

R1 Solid Waste Measure

The following R1 solid waste related measure is a measure that California has identified in the AB 32 Scoping Plan that will result in emission reductions within the City.

R1-S1: WASTE MEASURES

The CARB AB32 Scoping Plan recommends three measures for reducing emissions from Municipal Solid Waste at the State level, including: 1) landfill methane control; 2) increase the efficiency of landfill methane capture; and 3) high recycling/zero waste. CARB approved a regulation implementing the discrete early action program for methane recovery (1), which became effective June 17, 2010. This measure is expected to result in a 1.0 MMTCO2e reduction by 2020 (CARB 2008). Other measures proposed by CARB include increasing efficiency of landfill methane capture (2) and instituting high recycling/zero waste policies (3). Potential reductions associated with these measures are still to be determined.

R2 Solid Waste Measures

The following R2 measure reduces emissions related to solid waste and helps Corona to achieve an AB 32 compliant reduction target.

R2-S1: CITY DIVERSION PROGRAM

This measure would implement a City wide waste diversion goal of diverting 75% (current diversion rate is 58%) of all waste from landfills by 2020. The following is a potential list of waste reduction measures that will further strengthen existing waste reduction/diversion programs along with coordination with Waste Management and El Sobrante Landfill.

- Provide outreach and education programs for residential, commercial, and industrial land uses in order to further promote existing City diversion programs;
- Increase disposal fees and/or reduce residential pick-up frequency;
- Encourage businesses to adopt a voluntary procurement standard and prioritize those products that have less packaging, are reusable, recyclable, or compostable;
- Support State level policies that provide incentives for efficient and reduced packaging waste for commercial products;
- Provide waste audits:
- Make recycling and composting mandatory at all public events;
- Establish an appliance end-of-life requirement;
- For new developments, require the use of recycled-content materials, or recycled materials;

- Require a minimum of 15% of materials used in construction be sourced locally, as feasible;
- Encourage the use of recycled building materials and cement substitutes for new developments;
- Reuse and recycle construction and demolition waste (including, but not limited to, soil, vegetation, concrete, lumber, metal, and cardboard);
- Provide interior and exterior storage areas for recyclables and green waste at all buildings;
- Provide adequate recycling containers in public areas, including parks, school grounds, golf courses, and pedestrian zones in areas of mixed-use development; and
- Provide education and publicity about reducing waste and available recycling services.

R3 Solid Waste Measures

The following R3 measures enhance and/or ensure the reductions accounted for within the R2 measure identified above.

R3-S1: ENCOURAGE INCREASED EFFICIENCY OF THE GAS TO ENERGY SYSTEM AT LANDFILLS.

In 2004, the El Sobrante Landfill installed 3 gas-to-energy systems which convert 66% of the methane captured to energy.



This measure would encourage El Sobrante to keep current with upgrades in efficiencies to waste to energy systems and to upgrade as feasible when significant increases in conversion efficiencies are available. Corona's waste is deposited in the El Sobrante Landfill, so the emissions from Corona's solid waste are dependent on the waste management and methane capture systems in place at El Sobrante. Any reductions in emissions from the landfill will, in turn, reduce Corona's emissions from solid waste generation.

R3-S2: WASTE EDUCATION PROGRAM

This measure would build on Corona's existing waste education program to provide public education and increased publicity about commercial and residential recycling. This measure would educate the public about waste reduction options available at both residential and commercial levels, including composting, grass recycling, and waste prevention, and available recycling services.

4.7 Agriculture

R2 Agriculture Reduction Measure

The following R2 measure is a candidate measure related to agriculture the City can incorporate into the City CAP to achieve an AB 32 compliant reduction target.

R2-A1: AGRICULTURAL WATER MANAGEMENT

Encourage the agricultural community to be cognizant of the necessity of water conservation and to provide access to



information on technologies to reduce potable water usage where feasible. This would encourage the City in conjunction with the local water purveyors to explore the feasibility of and promote using recycled water while maintaining water quality and quantity necessary for agriculture purposes. Further, this would encourage the City to explore the feasibility of and promote water management.

4.8 R2 Reduction Measures Summary

Table 4-3, below, summarizes the R2 reduction measures for the City of Corona. These measures are implemented at the local level through a variety of ways. Many of the reduction measures are targeted toward new development and are implemented through the screening tables accompanying this C-CAP and included in Appendix F. Others are implemented through expanded or continued enforcement of existing Corona programs, while other reduction measures are accomplished through coordination with other agencies.

Table 4-3 Corona R2 GHG Reduction Measures			
Reduction Measure	Implementation	Example Project	More Information
Transportation			
R2-T1: Land Use Based Trips and VMT Reduction Policies	Screening Table for New Development	Ventura County VMT Reduction Report	http://www.ventura.org/rma/planning/pdf/studies/vmt_reduction.pdf
R2-T2: Residential Permit Parking	Existing neighborhoods meeting eligibility requirements can apply to Public Works.	Existing City of Corona Program	http://www.ci.corona.ca.us/index.cfm?s ection=City%20Departments&page=Publ ic%20Works&cat=Public%20Facility%20 Maintenance&viewpost=2&ContentId=1 32#ppp

Reduction Measure	Implementation	Example Project	More Information
R2-T3: Bicycle Master Plan	Screening Table for New Development	Existing City of Corona Plan	http://www.discovercorona.com/index.c fm?section=City%20Departments&page= Public%20Works&cat=Public%20Services %20and%20Information&viewpost=2&C ontentId=149
R2-T4: WRCOG Neighborhood Electric Vehicle Plan	Screening Table for New Development Regional Agency Coordination	NEV Plan for City of Lincoln, CA http://www.ci.lincoln.ca.us/inde x.cfm?page=965064	http://www.wrcog.cog.ca.us/content/tra nsportationissues.asp
Energy			
R2-E1: New Construction Residential Energy Efficiency Requirements	Screening Table for New Development Energy Star New Homes	City of Berkeley, CA Energy Efficiency for Homes http://www.ci.berkeley.ca.us/C ontentDisplay.aspx?id=19376	http://www.energystar.gov/index.cfm?c =new_homes.hm_index
R2-E2: New Construction Residential Renewable Energy	Screening Table for New Development CA Energy Commission's New Solar Homes Partnership	City of Riverside, Residential PV System Rebate http://www.riversideca.gov/utili ties/resi-pv-incentive.asp	http://www.gosolarcalifornia.org/about/ nshp.php
R2-E3: Residential Energy Efficiency Retrofits	WRCOG Energy Efficiency and Water Conservation Program	Existing Program	http://www.wrcog.cog.ca.us/content/ee wc_home.asp
R2-E4: Residential Renewable Energy Retrofits	CA Energy Commission's Solar Initiative WRCOG Energy Efficiency and Water Conservation Program	City of Riverside, Residential PV System Rebate http://www.riversideca.gov/utili ties/resi-pv-incentive.asp	http://www.gosolarcalifornia.ca.gov/csi/index.php http://www.wrcog.cog.ca.us/content/eewc_home.asp
R2-E5: New Construction Commercial Energy Efficiency Requirements	Screening Table for New Development	Imperial Irrigation District New Construction Energy Efficiency Program http://www.iid.com/index.aspx? page=296	CalRecycle Sustainable Building Guidelines http://www.calrecycle.ca.gov/Greenbuil ding/Design/Guidelines.htm
R2-E6: New Construction Commercial/Industrial Renewable Energy	Screening Table for New Development	City of Riverside, Non- Residential PV System Rebate http://www.riversideca.gov/utili ties/busi-solar.asp	CalRecycle Sustainable Building Guidelines http://www.calrecycle.ca.gov/Greenbuil ding/Design/Guidelines.htm
R2-E7: Commercial/Industrial Energy Efficiency and Renewable Energy Retrofits	CA Energy Commission's Solar Initiative WRCOG Energy Efficiency and Water Conservation Program	City of Riverside, Non- Residential PV System Rebate http://www.riversideca.gov/utili ties/busi-solar.asp	http://www.gosolarcalifornia.ca.gov/csi/index.php http://www.wrcog.cog.ca.us/content/eewc_home.asp
R2-E8: Induction Streetlight Retrofits	EECBG-funded project	Existing City of Corona Project	http://www.ci.corona.ca.us/index.cfm?s ection=City%20Departments&page=Publ ic%20Works&cat=Refuse%20and%20Rec ycling&viewpost=2&contentid=1273

CHAPTER 4 GHG EMISSIONS REDUCTION PROGRAMS AND REGULATIONS

Reduction Measure	Implementation	Example Project	More Information
R2-E9: Solar Power for Water Reclamation Facility #1	EECBG-funded project	Existing City of Corona Project	http://www.ci.corona.ca.us/index.cfm?s ection=City%20Departments&page=Publ ic%20Works&cat=Refuse%20and%20Rec ycling&viewpost=2&contentid=1273
R2-E10: Additional Energy Efficiency Retrofit Projects	Community Energy Partnership	Existing City of Corona Partnership	http://www.communityenergypartnersh p.org/
Water			•
R2-W1: Water Use Reduction Initiative	Screening Table for New Development Continue and expand existing water programs	Existing City of Corona Project	http://www.ci.corona.ca.us/index.cfm?s ection=City%20Departments&page=Dep %2E%20of%20Water%20%26%20Power &cat=Conservation%20%26%20Rebates &viewpost=2&ContentId=1304
Solid Waste			
R2-S1: City Diversion Program	Coordination with Waste Management and Riverside County	CA Integrated Waste Management Board Resources	http://www.calrecycle.ca.gov/LGCentral, Library/Innovations/Incentives/HaulInce n.htm
Agriculture			
R2-A1: Agricultural Water Management	Falls under implementation of R2-W1: Water Use Reduction Initiative	See R2-W1 (above)	See R2-W1 (above)

Chapter 5	Total	Fstimated	Reductions
Chapters	Total	Latinated	Reductions

In 2020, the City of Corona is projected to emit a total of 1.96 MMT CO_2e without the incorporation of reduction measures. The City emissions for 2020 are estimated to be reduced to 1.48 MMT CO_2e . Emission reductions estimated for year 2020 were based on the accomplishments likely to be achieved as indicated in the measures detailed in Section 4. A detailed description of the reduction calculations is included as Appendix E.

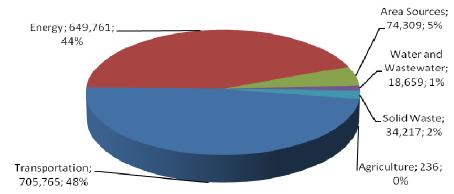
5.1 Reduced 2020 Net Total Emissions

Table 5-1 summarizes the net reduced 2020 City emissions of CO₂e as broken down by Emissions category. Figure 5-1 is a graphical representation of Table 5-1. A detailed breakdown of reduced 2020 emissions by category is available in Appendix D.

Table 5-1	Reduced 2020 Net Total Emissions	
Category	Metric tons of CO2e	
Transportation	705,765	
Energy	649,761	
Area Sources	74,309	
Water and Wastew	vater 18,659	
Solid Waste	34,217	
Agriculture	236	
Total	1,482,947	

Figure 5-1 Reduced 2020 Emissions by Source (MT CO₂e)





5.2 Net Emissions Comparison by Year

With the reduction measures outlined in Section 4 above, Corona's emissions are estimated to decrease to 1,482,947 MT CO_2e , which is below the reduction target of 1,483,963 for 2020. The reduced 2020 emissions are an estimated 481,286 MT CO_2e below 2020 BAU emissions and 262,892 MT CO_2e below 2008 emissions. Table 5-2 shows a comparison between the 2008 and 2020 levels, including what the 2020 BAU emissions would have been and what 2020 emissions are anticipated to be with the inclusion of these reduction measures.

Table 5-2 Net Total Emissions by Year			
	Metric tons of CO₂e		
Source Category	2008	BAU 2020	Reduced 2020
Transportation	832,888	959,252	705,765
Energy	770,657	849,138	649,761
Area Sources	75,922	82,221	74,309
Water and Wastewater	25,783	27,456	18,659
Solid Waste	40,354	45,929	34,217
Agriculture	236	236	236
Total	1,745,839	1,964,233	1,482,947
2020 Target	N/A	1,483,963	1,483,963
Above Target?	N/A	Yes	No

Note that in comparing 2008, 2020 BAU, and Reduced 2020, the greatest reductions were achieved in transportation. This is due to three factors, first the City has been working on vehicle trip and VMT reductions for over a decade and now has data to document proven transportation related reductions. Secondly, implementing the vehicle trip and VMT reducing measures such as TDM and ATMS has resulted in reductions that the City can now build upon. Lastly, the City of Corona has been able to better predict future transportation related reductions through the modeling the City on the Riverside County Traffic Analysis Model (RIVTAM) that includes origin and destination of trips through subroutines. The combination of a decade of data collection on vehicle trip and VMT reductions, past performance in implementing vehicle trip and VMT reductions, and better modeling of Vehicle trip and VMT reductions by the City of Corona has resulted in the ability to quantify those reductions within this CAP.

CHAPTER 5 TOTAL ESTIMATED REDUCTIONS

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Chapter 6 Conclusion

This Corona Climate Action Plan serves as a guide to help the City pursue work plans with the objectives of conserving resources and reducing GHG emissions. This document also serves as a technical resource for the update of the City's current General Plan and other land use related documents that may require evaluation and documentation of GHG emissions. Figures 6-1 show a comparison between the emission inventories and the reduction target.

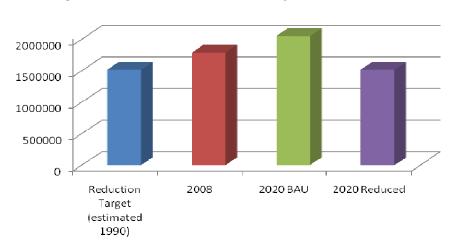


Figure 6-1 Total Emissions by Year (MT CO₂e)

A target has been set to reduce City-wide GHG emission emissions by 15% from 2008 levels by 2020 consistent with the State reduction goals in AB 32. The CARB Scoping Plan provides the State with reduction strategies designed to meet the reduction goal of AB 32. The City has a reduction strategy as described in section 4 that is predicted to meet the State reduction goal. Reduction measures provided herein will ensure that Corona meets the AB 32 reduction target of reducing to 15% below 2008 levels (reduce down to 1,483,963 MT CO₂e) by 2020. Such programs include strengthening the City's existing vehicle trip and VMT reduction strategies, ordinances as well as implementing energy efficiency programs, solar rebates, conservation programs, incentives and ordinances. In some cases, implementation will require the cooperation of other agencies, private businesses, and residents. The success of these measures will be tracked using indicators and targets such as those described in this C-CAP. Even with the anticipated growth, the modernization of vehicle fleets, combined with the continued implementation of the proposed R2 and R3 measures, will reduce GHG emissions by approximately 481,286 MT CO₂e. Therefore, the implementation of the State (R1) measures combined with the City's R2 and R3 measures will reduce GHG emissions down to 1,482,947 MT CO₂e by year 2020, which exceeds the reduction target by 1,016 MT CO₂e.

Continued implementation of this C-CAP in post 2020 years is discussed in Section 7, Step 7 below.

Chapter 7 Implementation

This section describes implementation steps for the C-CAP to support achievement of the GHG reduction goals for the community at large. Success in meeting City's GHG emission reduction goal will depend on cooperation, innovation, and participation by City offices and residences, businesses, and government entities in the City's land use jurisdiction with regards to implementing the C-CAP. This section outlines key steps that the City will follow for the implementation of this C-CAP.

7.1 STEP 1—Administration and Staffing

The City will implement the following key internal administration and staffing actions:

- Create a GHG Reduction Team (GRT) to support and guide the City's efforts to reduce emissions.
- Appoint a permanent Implementation Coordinator to coordinate implementation of the C-CAP.

The City GRT will be responsible for the implementing this C-CAP, coordinating among all involved City departments, and recommending modifications and changes to the C-CAP over time. The GRT will, at a minimum, include the following departments, but will be expanded as needed to ensure coordinated leadership in plan implementation: Community Development, Transportation, Engineering, Department of Water and Power, Redevelopment Agency, and Parks and Community Services.

7.2 STEP 2—Financing and Budgeting

The Implementation of the C-CAP will require creative, continuing, and committed financing in order to work. Local, regional, state, and federal public sources of funding will be needed along with the substantial involvement of the private sector. As one of the first priorities for implementation of the plan, the City considered how to fund implementation of the plan. Fortunately, the City has existing finance strategies for the bicycle path master plan, energy efficiency retrofits, water conservation, and other programs that the City is doing that complement the CAP. These same existing City finance strategies will be used to implement some of the reduction measures, while project applicants will be responsible for implementing the remaining reduction measures through the use of the screening table. Additionally, the City will use the finance strategies to monitor the implementation of the reduction measures and update the GHG inventory. These finance strategies will take into account the costs and staff resources throughout implementation of the plan as well as the financial benefits and cost savings. The following different financing options are used in the finance strategies:

- State and Federal Grants and Low-interest Loans —As described below there are a variety of grant and loan programs that exist in various sectoral areas.
- Support from Local Businesses, Non-Profits, and Agencies—Opportunities for public/private partnerships (like the existing SCE partnerships) exist to provide cooperation on many aspects of the C-CAP including energy efficiency retrofits, waste minimization, transit promotion, and education.

- Agreements with Private Investors—Energy service companies (ESCOs) and other private companies can finance up-front investments in energy efficiency and then be reimbursed through revenues from energy savings.
- Taxes and Bonds—Various municipalities have used targeted finance instruments for solar, transportation, vehicle improvements, and landfill methane controls.

Given that financing is key to implementing many measures, a review of current and potential funding sources was completed for the different sectors covered in this C-CAP and is presented below to help early phase implementation of the C-CAP. Whether at the federal, western regional or state level, it appears likely that there will be some form of a cap and trade system in place within several years. This system, depending on its particular character, is likely to influence energy prices (such as for electricity, natural gas, and vehicle fuels), and may make currently cost-ineffective measures more economically feasible in the medium term and allow the financing of a broader range of plan measures.

Energy Efficiency and Renewable Energy Financing

Federal Energy Efficiency Community Block Grants (EECBG). As part of the stimulus package (the "American Recovery and Reinvestment Act" or ARRA), signed into law by President Obama in spring 2009, block grants are available for energy efficiency planning and improvements in the building, transportation, and other sectors. The purpose of the EECBG Program is to assist eligible entities in creating and implementing strategies to: reduce fossil fuel emissions in a manner that is environmentally sustainable and that maximizes, to the greatest extent practicable, benefits for local and regional communities; reduce the total energy use of the eligible entities; and improve energy efficiency in the building sector, the transportation sector, and other appropriate sectors. Eligible activities include: development of an energy efficiency and conservation strategy; technical consultant services; residential and commercial building energy audits; financial incentive programs; energy efficiency retrofits; energy efficiency and conservation programs for buildings and facilities; development and implementation of certain transportation programs; building codes and inspections; certain distributed energy projects; material conservation programs; reduction and capture of methane and greenhouse gases from landfills and dairies; efficiency traffic signals and street lighting; renewable energy technologies on government buildings; and other appropriate activity.

Corona has received \$1,454,200 in funds from the EECBG. The projects planned for the City include 2 projects: 1) Solar Power for Water Reclamation Facility #1 and 2) Street Light Induction Retrofits.

Federal Tax Credits for Energy Efficiency. On October 3, 2008, President Bush signed into law the "Emergency Economic Stabilization Act of 2008." This bill extended tax credits for energy efficient home improvements (windows, doors, roofs, insulation, HVAC, and non-solar water heaters). These residential products during 2008 were not eligible for a tax credit, as previous tax credits had expired at the end of 2007. The bill also extended tax credits for solar energy systems and fuel cells to 2016. New tax credits were established for small wind energy systems and plug-in hybrid electric vehicles. Tax credits for

CHAPTER 7 IMPLEMENTATION

builders of new energy efficient homes and tax deductions for owners and designers of energy efficient commercial buildings were also extended.

See: http://www.energystar.gov/index.cfm?c=products.pr_tax_credits.

SCE Energy Efficiency / Renewable Energy Incentives

- Online or mail-in Home Energy Efficiency Survey. This 15-minute survey gives helpful energy-saving tips that will also help the environment. The questions and tips are tailored are about residential energy usage.
- Rebate programs for residential use include; lighting, appliances, heating and cooling, multifamily housing, pool, solar leadership and customer generation.
- Energy Centers provide free information, training, and support to make important Energy Management and energy efficiency choices.
- SCE Energy Manager offers online access to usage information and detailed cost analyses business energy use.
- Financial Offerings include on-Bill Financing, Zero-interest financing towards the purchase and installation of qualifying energy efficient equipment for commercial, industrial and agricultural customers.
- Regulation & Compliance Support "The Cool Planet Project" assists customers with recent installations or efficiency projects resulting in excess of one million kWh of energy in joining the Climate Registry.
- Solar Leadership helps create a cleaner energy future with innovative solutions that make it possible for you to join the solar movement.
- Self-Generation provides financial incentives for installing self-generation equipment to meet all or a portion of facility's energy needs.
- Specialized Services for Facilities:
- New Buildings-Receive technical assistance in the design and construction of new energy efficient buildings.
- Savings by Design: New construction builders and buyers can receive design assistance, owner incentives, and design team incentives.
- California Advanced Homes Incentives, design assistance, and technical education and services to encourage home builders to build home that exceed California's Title 24 code standards by at least 15%.
- Full-service solutions are available to qualifying customers to receive assistance in identifying and evaluating energy efficiency opportunities within existing buildings.
- Retro Commissioning Receive assistance to improve the bottom line in existing building's operations through specialized services to detect inefficiencies in complex building systems, and to determine optimum operating conditions.

- Heating Ventilation & Air Conditioning Lower operating costs and increase equipment life through proper HVAC installation and regular maintenance. Future programs will focus on two key components:
- A/C Quality Maintenance, and
- A/Q Quality Installation.

AB 811 Financing Districts. AB 811 permits the creation of assessment districts to finance installation of distributed generation renewable energy sources or energy efficiency improvements that are permanently fixed to residential, commercial, industrial, or other real property. Corona's partnership with WRCOG in creation of the Energy Efficiency and Water Conservation Program allows home and business owners to utilize this type of financing program and avoid upfront costs associated with energy system installations. Financing is repaid through the property tax bill and repayment obligations remain with the property when it is sold to a new owner.

California Energy Commission (CEC) Energy Efficiency Financing. The CEC offers up to \$3 million per application in energy efficiency financing and low interest loans to cities and counties for installing energy-saving projects. Examples of projects include: lighting systems, pumps and motors, streetlights and LED traffic signals, automated energy management systems/controls, building insulation, energy generation including renewable and combined heat and power projects, heating and air conditioning modifications, and waste water treatment equipment.

See http://www.energy.ca.gov/efficiency/financing/

California Energy Commission Bright Schools Program. This is a collaborative project of the CEC, California Conservation Corps, local utility companies and other qualifying energy service companies to assist schools in undertaking energy efficiency projects. Project staff will guide schools through identifying and determining a project's feasibility, securing financing for the project, and purchasing and installing the new energy efficient equipment.

See http://www.energy.ca.gov/efficiency/brightschools/index.html

Transportation Financing

Federal Energy Efficiency Community Block Grants (EECBG). As described above, eligible activities include development and implementation of certain transportation programs and efficiency traffic signals and street lighting.

Regional Transportation Improvement Program (RTIP). The Regional Transportation Improvement Program (RTIP) is funded from 75 percent of the funds made available for transportation capital improvement projects under the State Transportation Improvement Program (STIP). This program targets urban projects that are needed to improve transportation within the region. The Southern California Association of Governments (SCAG) recommends to the California Transportation Commission (CTC) the selection of these projects, which can include state highway improvements, local roads, public transit, intercity rail, grade separations, and more.

Interregional Improvement Program (IIP). The Interregional Improvement Program (IIP) is funded from 25 percent of the funds made available for transportation capital improvement projects under the STIP. This program targets projects that are needed to improve interregional movement of people and goods. Caltrans recommends to the CTC the selection of these projects, which can include state highway improvements, intercity passenger rail, mass transit guide ways, or grade separation projects.

Waste Reduction Financing

California Integrated Waste Management Board Grants and Loans. The CIWMB offers funding opportunities authorized by legislation to assist public and private entities in the safe and effective management of the waste stream. See http://www.ciwmb.ca.gov/grants/ for more details.

Water Conservation and Treatment Financing

Clean Water State Revolving Funds. CWSRFs fund water quality protection projects for wastewater treatment, nonpoint source pollution control, and watershed and estuary management. CWSRFs have funded over \$74 billion, providing over 24,688 low-interest loans to date.

See http://www.epa.gov/owm/cwfinance/cwsrf/index.htm for more details.

CWSRF's offer:

- Low Interest Rates, Flexible Terms—Nationally, interest rates for CWSRF loans average 2.3 percent, compared to market rates that average 5 percent. For a CWSRF program offering this rate, a CWSRF funded project would cost 22 percent less than projects funded at the market rate. CWSRFs can fund 100 percent of the project cost and provide flexible repayment terms up to 20 years.
- Funding for Nonpoint Source Pollution Control and Estuary Protection—CWSRFs provided more than \$167 million in 2009 to control pollution from nonpoint sources and for estuary protection, more than \$3 billion to date.
- Assistance to a Variety of Borrowers—The CWSRF program has assisted a range of borrowers including municipalities, communities of all sizes, farmers, homeowners, small businesses, and nonprofit organizations.
- Partnerships with Other Funding Sources—CWSRFs partner with banks, nonprofits, local governments, and other federal and state agencies to provide the best water quality financing source for their communities.

7.3 STEP 3—Timeline and Prioritization

The City will develop an implementation schedule based on the completion of the full cost effectiveness analysis and the Climate Finance Plan. The cost effectiveness analysis will determine which strategies can reduce the most emissions at the least cost. Prioritization will be based on the following factors:

- Cost effectiveness;
- GHG reduction efficiency;
- Availability of funding;
- Level of City Control;
- Ease of implementation; and
- Time to implement.

In general consideration of these factors, the following is an outline of key priorities for three (3) phases starting in 2011 through 2020.

- Phase 1 (2011–2012): Development of key ordinances, completion of key planning efforts, implementation of most cost-effective measures, and support of voluntary efforts.
- Phase 2 (2013–2015): Continued implementation of first tier measures, implementation of second tier measures, and implementation of key planning outcomes from Phase 1.
- Phase 3 (2015–2020): Continued implementation of first and second tier measures, implementation of third tier of measures.

Because the goals of this C-CAP are aggressive, success in meeting the C-CAP goals depend on some flexibility in the GHG reduction actions. The City is committed to flexibility in implementing the reduction measures and meeting the goals of this C-CAP. Many of the reduction measures in this Plan may be implemented through a menu of options. The goals of each reduction measure can often be achieved through a variety of means, especially those related to building energy efficiency. Compliance with the energy efficient building measures can be achieved through many combinations of actions including (but not limited to): installing energy efficient appliances, lighting, and HVAC systems; installing solar panels and solar water heaters; siting and orienting buildings to optimize conditions for natural heating, cooling, and lighting; installing top-quality windows and insulation; and incorporating natural shading, skylights, and reflective surfaces. Table 7-1 presents the potential timeline and phasing schedule for the GHG reduction measures.

Table 7-1 GHG Reduction Measure Timeline and Ph Schedule	asing
Reduction Measure	Phase
Transportation	
R2-T1: Land Use Based Trips and VMT Reduction Policies	1, 2, 3
R2-T2: Preferential Parking	1
R2-T3: Bicycle Master Plan	1
R2-T4: WRCOG Neighborhood Electric Vehicle Plan	1
Energy	
R2-E1: New Construction Residential Energy Efficiency Requirements	1
R2-E2: New Construction Residential Renewable Energy	1, 2, 3
R2-E3: Residential Energy Efficiency Retrofits	1, 2, 3
R2-E4: Residential Renewable Energy Retrofits	1, 2, 3
R2-E5: New Construction Commercial Energy Efficiency Requirements	1
R2-E6: New Construction Commercial/Industrial Renewable Energy	1, 2, 3
R2-E7: Commercial/Industrial Energy Efficiency and Renewable Energy Retrofits	1, 2, 3
R2-E8: Induction Streetlight Retrofits	1
R2-E9: Solar Power for Water Reclamation Facility #1	1
R2-E10: Additional Energy Efficiency Retrofit Projects	1
Water	
R2-W1: Water Use Reduction Initiative	1
Solid Waste	
R2-S1: City Diversion Program	2
Agriculture	
R2-A1: Agricultural Water Management	2

7.4 STEP 4—Public Participation

The citizens and businesses in Corona are integral to the success of GHG reduction efforts. Their involvement is essential in order to reach the reduction goals because this C-CAP depends on a combination of state and local government efforts, public and private sources of finance, and the voluntary commitment, creativity, and participation of the community at large. The City must strike a balance between development and environmental stewardship to keep our economy strong and, at the same time, protect our environment. The City will educate stakeholders such as businesses, business groups, residents, developers, and property owners about the C-CAP and encourage participation in efforts to reduce GHG emissions in all possible sectors.

7.5 STEP 5—Project Review

The CEQA guidelines support projects that lower the carbon footprint of new development, and encourage programmatic mitigation strategies that may include reliance on adopted regional blueprint plans, CAPs, and general plans that meet regional and local GHG emissions targets and that have also undergone CEQA review. The criteria needed to use adopted plans in evaluating impacts of GHG emissions from subsequent development projects is found in CEQA Guidelines § 15183.5. Once adopted, the C-CAP fulfills these requirements. The City is responsible for ensuring that new projects conform to these guidelines and meet the goals and requirements outlined in this C-CAP.

The City will implement the reduction measures for new development during the CEQA review, through the use of a City GHG Significance Threshold document based upon the C-CAP. The City GHG Significance Threshold document will provide guidance for the analysis of development projects and divide projects into two broad categories based upon the CEQA review they are going through. For smaller projects that through mitigation can support a Mitigated Negative Declaration (MND), a screening table will be utilized. The screening table provides a menu of reduction options. If a project can garnish 100 points from the screening table, the mitigated project will implement pertinent reduction measures such that it meets the reduction goals of the C-CAP and a less than significant finding can be made for the Project. The menu of options in the screening table is tied to the R2 Measures in the C-CAP such that 100 points will meet the emission reductions associated with the R2 Measures. This menu allows for maximum flexibility for projects to meet its reduction allocation. See Appendix F for the screening tables that accompany this C-CAP.

For larger projects that exceed the maximum size by land use in the top tier of the screening table, a more detailed analysis will need to be done. The City GHG Significance Threshold document will describe the methodology of quantifying and analyzing GHG emissions. The analysis for larger projects will need to quantify project generated GHG emissions, compare project design features with the R2 Measures in the C-CAP, if required, provide mitigation such that the project is consistent with all relevant R2 Measures, and quantify the reduced (mitigated) GHG emissions attributable to the project. If a large project is consistent with all the relevant R2 Measures, then a less than significant GHG impact finding can be made for the project. The methodology discussed above and described in more detail in the forthcoming City GHG Significance Threshold document will be consistent with the analysis and quantification methodology used in the C-CAP.

7.6 STEP 6—Monitoring and Inventorying

The City will create a system for monitoring the implementation of this C-CAP and adjusting the plan as opportunities arise. As the plan is implemented and as technology changes, the C-CAP should be revised to take advantage of new and emerging technology. If promising new strategies emerge, the City will evaluate how to incorporate these strategies into the C-CAP. Further, state and federal action will also result in changes which will influence the level of Corona emissions.

The GHG inventory will be periodically updated in coordination with the three (3) phases noted above: 2012 (to update with the Regional Transportation Plan outputs and Phase 1 progress); 2015 (to review Phase 2 progress, allow for course corrections to keep progress on target for 2020; and to develop post-2020 forecasts for use in planning for after 2020); and 2020 (to establish baseline for post-2020 GHG reduction planning). The City will also implement a monitoring and reporting program to evaluate the effectiveness of reduction measures with regards to progress towards meeting the goals of the C-CAP.

The monitoring and reporting program will take advantage of the Screening Tables during the development review process. Once applicants choose the measures within the Screening Tables that best fit their projects the completed Screening Table becomes a record of the reduction measures implemented by that project and the point values become a record of the anticipated GHG reductions anticipated once the project is built. Therefore, the completed Screening Tables will be used to record the implementation of the R2 measures related to new development.

Through a monitoring and reporting program, Corona will compare emissions from periodic inventories with the anticipated reductions described in this C-CAP. The City can then report on their progress toward achieving the reduction target.

7.7 STEP 7—Amending the C-CAP

The C-CAP is viewed by the City as a dynamic program that requires implementation, monitoring, evaluation and adaptation. A critical provision of any dynamic program anticipates amendments that will result in adaptation based on the experience gained from the evaluation of implementation and monitoring. The C-CAP will be amended as needed to achieve the 2020 reduction target and to incorporate future reduction strategies, such as those that are anticipated to result from regional scale reduction planning required by SB 375. Amendments will also be necessary to incorporate new or improved methodologies and protocols for measuring emission generation and mitigation reductions. The City anticipates that both major and minor amendments will be needed as C-CAP implementation progresses over time. The Community Development Department Director will review all proposed amendments to the C-CAP Major amendments will require review by the City Community Development Department, Planning Commission and adoption by City Council. Minor amendments can be accomplished upon review and approval by the Community Development Department Director.

Based on comprehensive updates to the GHG inventory, the City will evaluate whether the actual GHG emissions from activities over which the City has jurisdictional and operational control reflect the reductions anticipated in the C-CAP. If target reductions are not met at the 2015 re-inventory, the City will evaluate and adjust the measures and overall targets to reach the established 2020 targets. A second re-inventory is planned to coincide with an evaluation in 2018 as to Plan success.

Minor Amendments are anticipated as part of the Department's annual monitoring review of the Screening Tables and inventory update using the GHG inventory calculation tool. An assessment will be made as to the function of the Screening Table and the effectiveness of mitigation. Recommendations

for changes to the process will be made by Planning Staff and approved by the Community Development Department Director.

Major Amendments will be more comprehensive and are anticipated to occur in conjunction with the three year interval for re-inventorying that will be synchronized with the reduction measure phasing. At a minimum, one major amendment is anticipated to be required between the date of Plan adoption and 2020. Implementation Phases 1 and 2 (described in section 7.3) will be concluded in 2014 with re-inventorying completed in 2015. At this point, an important milestone assessment in the progress that the City is making with C-CAP implementation will occur. By this time, regional emissions reduction strategies resulting from SB 375 should be completed. Results from monitoring, re-inventorying and new regional reduction strategies will provide the appropriate data for a comprehensive amendment.

The next inventory is intended to occur in 2018 to assess continued progress toward the 2020 target date and implementation of the Phase 3 reduction measures. This inventory will provide a more comprehensive assessment of the Plan's success while providing a basis for adjusting the C-CAP for post 2020 target setting and continued reductions beyond 2020.

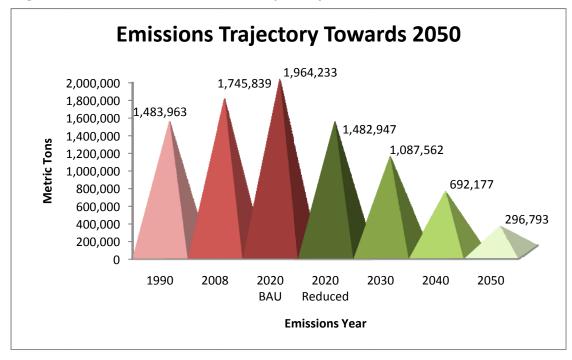
7.8 STEP 8—Beyond 2020

As described above under the discussion of Reduction Goals, 2020 is only a milestone in GHG reduction planning. Executive Order S-03-05 calls for a reduction of GHG emissions to a level 80 percent below 1990 levels by 2050, and this level is consistent with the estimated reductions needed to stabilize atmospheric levels of CO_2 at 450 parts per million (ppm). Thus, there will be a need to start planning ahead for the post-2020 period.

The City will commence planning for the post-2020 period starting in 2017, at the approximate midway point between plan implementation and the reduction target and after development of key ordinances and implementation of cost-effective measures. At that point, the City will have implemented the first two (2) phases of this C-CAP and will have a better understanding of the effectiveness and efficiency of different reduction strategies and approaches. Further, the State's regulations under AB 32 would have been fully in force since 2012; federal programs and policies for the near term are likely to be well underway; market mechanisms like a cap and trade system are likely to be in force and will be influencing energy and fuel prices; and continuing technological change in the fields of energy efficiency, alternative energy generation, vehicles, fuels, methane capture, and other areas will have occurred. The City will then be able to take the local, regional, state, and federal context into account. Further, starting in 2017 will allow for development of the post-2020 plan so that it can be ready for full implementation, including potential new policies, revisions to the General Plan (as necessary), programs, ordinances, and financing by 2020. The new plan will include a specific target for GHG reductions for 2030, 2040, and 2050. The targets will be consistent with broader state and federal reduction targets and with the scientific understanding of the needed reductions by 2050. The City will adopt the new plan by January 1, 2020. The long-term historical trend and continued emissions trajectory needed to achieve the 2050

goal are shown on Figure 7-1. Post 2020 target setting should look at the 2020 to 2050 trajectory needed to achieve the 2050 goal in setting post 2020 targets.

Figure 7-1 Emissions Trend &Trajectory Needed to Meet the 2050 Goal (MT CO₂e)



Chapter 8 References

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APPENDIX A: THE GREENHOUSE EFFECT, GREENHOUSE GASES, AND CLIMATE CHANGE IMPACTS

GLOBAL CLIMATE CHANGE

Parts of the Earth's atmosphere act as an insulating blanket of just the right thickness, trapping sufficient solar energy to keep the global average temperature in a suitable range. The 'blanket' is a collection of atmospheric gases called 'greenhouse gases' (GHGs) based on the idea that the gases also 'trap' heat like the glass walls of a greenhouse. These gases, mainly water vapor, carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), ozone, and chlorofluorocarbons (CFCs) all act as effective global insulators, reflecting back to earth visible light and infrared radiation. Human activities such as producing electricity and driving vehicles have contributed to the elevated concentration of these gases in the atmosphere. This in turn, is causing the Earth's temperature to rise. A warmer Earth may lead to changes in rainfall patterns, much smaller polar ice caps, a rise in sea level, and a wide range of impacts on plants, wildlife, and humans.

Leading scientists around the world agree that Global Warming Potential is a reality and that human activities are disrupting the earth's climate by intensifying the greenhouse effect.

1. THE GREENHOUSE EFFECT

A balance of naturally occurring gases dispersed in the atmosphere determines the Earth's climate by trapping solar heat. This phenomenon is known as the greenhouse effect. As sunlight passes through our atmosphere, the incoming solar radiation is eradiated from the earth's surface as heat energy. Greenhouse gases like carbon dioxide, methane, nitrous oxide, chlorofluorocarbons, and water vapor trap some of this reradiated energy. This trapped heat warms the earth, much as the glass of a greenhouse traps reradiated energy from sunlight and thereby warms the interior of the structure Figure 1-1 illustrates the Greenhouse Gas Effect.

2. GLOBAL WARMING

The natural "greenhouse effect" allows the earth to remain warm and sustain life. Greenhouse gases trap the sun's heat in the atmosphere, like a blanket, and help determine the existing climate. The increased consumption of fossil fuels (wood, coal, gasoline, etc.) has substantially increased atmospheric levels of greenhouse gases. As atmospheric concentrations of greenhouse gases rise, so do temperatures. Over time this rise in temperatures would result in climate change. Theories concerning climate change and global warming existed as early as the late 1800s. By the late 1900s the understanding of the earth's atmosphere had advanced to the point where many climate scientists began to accept that the earth's climate is changing. Today, many climate scientists agree that some warming has occurred over the past century and will continue through this century.

The Greenhouse Effect Some of the infrared Solar radiation powers radiation passes through the climate system. the atmosphere but most is absorbed and re-emitted in all directions by greenhouse gas molecules and clouds. The effect of this is to Some solar radiation warm the Earth's surface is reflected by and the lower atmosphere. the Earth and the atmosphere. ATMOSPHERE About half the solar radiation is absorbed by the Infrared radiation is Earth's surface and warms it. emitted from the Earth's surface.

Figure A.1 - The Greenhouse Gas Effect

Source: IPPC, 2008

The United Nations Intergovernmental Panel on Climate Change predicts that changes in the earth's climate will continue through the 21st century and that the rate of change may increase significantly in the future because of human activity. Many researchers studying California's climate believe that changes in the earth's climate have already affected California and will continue to do so in the future.

3. GREENHOUSE GASES

Parts of the Earth's atmosphere act as an insulating blanket of just the right thickness, trapping sufficient solar energy to keep the global average temperature in a suitable range. The 'blanket' is a collection of atmospheric gases called 'greenhouse gases' (GHGs) based on the idea that the gases also 'trap' heat like the glass walls of a greenhouse. These gases, mainly water vapor, carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), chlorofluorocarbons (CFCs), hydrofluorocarbons, perfluorocarbons, sulfur hexafluoride, ozone, and aerosols all act as effective global insulators, reflecting back to earth visible light and infrared radiation.

The accumulation of GHGs in the atmosphere regulates the earth's temperature Without the natural heat trapping effect of GHGs, the earth's surface would be about 34 degrees Centigrade (°C) cooler (CAT 2006). However, it is believed that emissions from human activities have elevated the concentration of these gases in the atmosphere beyond the level of naturally occurring concentrations. This in turn is causing the Earth's temperature to rise A warmer Earth may lead to changes in rainfall patterns, much smaller polar ice caps, a rise in sea level, and a wide range of impacts on plants, wildlife, and humans

Individual GHGs have varying global warming potential (GWP) and atmospheric lifetimes. The reference gas for GWP is carbon dioxide; carbon dioxide has a GWP of one Compared to methane's GWP of 21 it is clear that methane has a greater global warming effect than carbon dioxide on a molecule per molecule basis (EPA 2006b). As shown below in Table 1.1 GWP ranges from 1 (carbon dioxide) to 23,900 (sulfur hexafluoride).

Atmospheric lifetimes vary from 1.5 (HFC-152a) to 50,000 years (tetrafluoromethane). One teragram (equal to one million metric tons) of carbon dioxide equivalent (Tg CO₂ Eq.) is the mass emissions of an individual GHG multiplied by its GWP. The atmospheric lifetime and GWP of selected greenhouse gases are also summarized in Table 1.1.

Table A.1 Global Warming Potentials and Atmospheric Lifetimes

Gas	Atmospheric Lifetime (years)	Global Warming Potential (100 year time horizon)	
Carbon Dioxide	50 - 200	1	
Methane	12 ± 3	21	
Nitrous Oxide	120	310	
HFC-23	264	11,700	
HFC-134a	14.6	1,300	
HFC-152a	1.5	140	
PFC: Tetrafluoromethane (CF4)	50,000	6,500	
PFC: Hexafluoroethane (C2F6)	10,000	9,200	
Sulfur Hexafluoride (SF6)	3,200	23,900	
Source: U.S. Environmental Protection Agency, 2006.			

Of all greenhouse gases in the atmosphere, water vapor is the most abundant, important, and variable It is not considered a pollutant; in the atmosphere it maintains a climate necessary for life. The main source of water vapor is evaporation from the oceans (approximately 85 percent). Other sources include evaporation from other water bodies, sublimation (change from solid to gas) from ice and snow, and transpiration from plant leaves.

Ozone is also a greenhouse gas; however, unlike other GHGs, ozone in the troposphere is relatively short-lived and therefore is not global in nature. It is difficult to make an accurate determination of the contribution of ozone precursors (nitrogen oxides and volatile organic compounds) to global climate change (GCC) (CARB 2004b).

Aerosols are suspensions of particulate matter in a gas emitted into the air through burning biomass (plant material) and fossil fuels. Aerosols can warm the atmosphere by absorbing and emitting heat and can cool the atmosphere by reflecting light. Cloud formation can also be affected by aerosols. Sulfate aerosols are emitted when fuel containing sulfur is burned. Black carbon (or soot) is emitted during bio mass burning and incomplete combustion of fossil fuels. Particulate matter regulation has been lowering aerosol concentrations in the United States; however, global concentrations are likely increasing.

Carbon Dioxide

The natural production and absorption of carbon dioxide (CO₂) is achieved through the terrestrial biosphere and the ocean. However, humankind has contributed to the alteration of the natural carbon cycle by burning coal, oil, natural gas, and wood. Since the industrial revolution began in the mid 1700s, each of these human-caused activities has increased in scale and distribution. Carbon dioxide was the first GHG demonstrated to be increasing in atmospheric concentration with the first conclusive measurements being made in the last half of the 20th century. Prior to the industrial revolution, concentrations were fairly stable at 280 ppm. Today, they are around 370 ppm, an increase of well over 30 percent (EPA 2006). Left unchecked, the concentration of carbon dioxide in the atmosphere is projected to increase to a minimum of 540 ppm by 2100 as a direct result of anthropogenic sources (IPCC 2001). This will result in an average global temperature rise of at least two degrees Celsius (3.6 °F) (IPPCC 2001).

Carbon dioxide emissions are directly generated primarily in the form of vehicle exhaust and in the consumption of natural gas for heating Carbon dioxide emissions are also generated from natural gas combustion and indirectly through the use of electricity. Other indirect sources of carbon dioxide include the use of potable water and generation of wastewater (potable water and wastewater treatment generates greenhouse gases), and the generation of solid waste

Methane

Methane (CH₄) is an extremely effective absorber of radiation, though its atmospheric concentration is less than carbon dioxide and its lifetime in the atmosphere is brief (10-12 years), compared to some other GHGs (such as carbon dioxide, nitrous oxide, and CFCs). Methane has both natural and anthropogenic (human) sources. It is released as part of the biological processes in low oxygen environments, such as in swamplands or in rice production (at the roots of the plants). Over the last 50 years, human activities such as growing rice, raising cattle, using

natural gas and mining coal have added to the atmospheric concentration of methane (EPA 2006b).

Nitrous Oxide

Concentrations of nitrous oxide (N₂O) also began to rise at the beginning of the industrial revolution. Microbial processes in soil and water, including those reactions that occur in fertilizer containing nitrogen, produce nitrous oxide. The use of fertilizers has increased over the last century. Global concentration for nitrous oxide in 1998 was 314 ppb, and in addition to agricultural sources for the gas, some industrial processes (fossil fuel-fired power plants, nylon production, nitric acid production, and vehicle emissions) also contribute to its atmospheric load (EPA 2006b).

Chlorofluorocarbons

Chlorofluorocarbons (CFCs) have no natural source, but were synthesized for use as refrigerants, aerosol propellants and cleaning solvents. Since their creation in 1928, concentrations of CFCs in the atmosphere have been rising. Due to the discovery that they are able to destroy stratospheric ozone, a global effort to halt their production was undertaken and was extremely successful, so much so that levels of the major CFCs in the atmosphere are now remaining static or declining. However, their long atmospheric lifetimes mean that some of the CFCs will remain in the atmosphere for over 100 years. Since they are also a GHG, along with such other long-lived synthesized gases as CF₄ (carbontatrafuoride) and SF₆ (sulfurhexafluoride), they are of concern. Another set of synthesized compounds called HFCs (hydrofluorcarbons) are also considered GHGs, though they are less stable in the atmosphere and therefore have a shorter lifetime and less of an impact (EPA 2006b) CFCs, CF₄, SF₆ and HFCs have been banned and are no longer available on the market.

4. HUMAN AND CULTURAL CAUSES OF CLIMATE CHANGE

Like all other animals, humans participate in the natural carbon cycle, but there are important differences between human and animal activities. By burning coal, oil, and natural gas, humans are adding carbon dioxide (CO₂) to the atmosphere much faster than the carbon in rocks is released through natural processes. Clearing and burning forests to create agricultural land converts organic carbon to carbon dioxide gas. The oceans and land plants are absorbing a portion, but not nearly all of the CO₂ added to the atmosphere by human activities. Human climate drivers include heat-trapping emissions from cars and power plants, aerosols from pollution, and soot particles.

5. IMPACTS FROM GREENHOUSE GAS EMISSIONS

Global Impacts

While in some cases global climate change may temporarily improve certain aspects of a region, such as lengthening the growing season, it is estimated that the ecology of the natural world will not be able to adjust quickly enough to prevent widespread environmental degradation (IPCC, 2001). In California, it is likely that warmer temperatures will result in frequent and longer periods of drought (UCS 1999). The majority of the scientific community has stated that beyond doubt, global climate change will be one of the most significant challenges the globe will face in the twenty-first century, and will impact almost every system we depend upon for survival.

Just as humans are affected by climate change, so too are plants and animals Animals must breathe the same air and are subject to the same types of negative health effects as humans. Certain plants and trees may absorb air pollutants that can stunt their development or cause premature death.

There are also numerous impacts to the human economy including lost workdays due to illness, a desire on the part of business to locate in areas with a healthy environment, and increased expenses from medical costs. Pollutants may also lower visibility and cause damage to property. Certain air pollutants are responsible for discoloring painted surfaces, eating away at stones used in buildings, dissolving the mortar that holds bricks together, and cracking tires and other items made from rubber.

The United States has the highest per capita emissions of GHGs in the world, 22 tons of CO_2 per person per year (see figure 1-2). With only five percent of the world's population, the United States is responsible for 24 percent of the world's CO_2 emissions. California, despite its strong environmental regulations, is the second largest greenhouse gas polluting state in the nation, and emits 2% of global human-generated emissions. Its largest contribution of CO_2 is from vehicle emissions.

According to the International Panel on Climate Change (IPCC), the following are current worldwide statistics for CO₂ concentrations (IPCC, 2008):

- The atmospheric concentration of carbon dioxide (CO₂) during the last two decades has increased at the rate of 0.4% every year.
- Current CO₂ concentrations are higher than they have been in the last 420,000 years, and according to some research, the last 20 million years.
- About three-quarters of the CO₂ emissions produced by human activity during the past 20 years are due to the burning of fossil fuels.

25 22.2 20.0 20 Tons eCO₂ per Person 15 12.2 11.0 10.4 10.1 10 5 4.3 2.6 1.0 India China UK Germany Russia Canada US World Japan Average

Figure A-2 - Per Capita CO₂ Emissions from 2001

Source: Energy Information Administration, 2001.

Human Health

According to the Pew Center's report on Human Health and Climate Change, health threats may depend on surpassing a threshold level of a climate factor such as significant change in temperature, precipitation, or storm frequency. Once that threshold has passed, the incidence of disease may drastically increase.

Environmental factors play a significant role in some diseases carried by insects. Warming could make tick-borne Lyme disease more prevalent. Mosquito-borne diseases such as West Nile virus, Dengue Fever, and Malaria could acquire new ranges and access to previously unexposed populations (IPCC, 2001). For example, the temperature range at which the malaria-carrying mosquito lives is sensitive to a mere one-degree in temperature change; thus an overall increase in global temperatures will increase the land areas where it may spread disease. These temperature changes affect not only the mosquitoes, but also disturb and in some cases decrease the habitats of its natural predators (Rogers, 2002).

Ecosystems

Scientists predict serious consequences of global warming. The rapid, unprecedented increase in temperatures accelerates the water cycle, which then increases the occurrence, variability, and severity of storms and drought (IPCC, 2008). Such extreme climate events will potentially disrupt ecosystems and damage food and water supplies. In addition, increased temperatures cause thermo-expansion of the oceans and accelerate the melting of the icecaps, thereby raising the overall level of the oceans. The sea-level rise may have multiple outcomes, including significant

environmental disturbances, coastline destruction, major population displacement and economic disruption

While there is some degree of uncertainty, scientists are able to predict many of the challenges that climate change presents to ecosystems. Warmer temperatures may force some species to higher altitudes or more northern latitudes. This migration may be prevented by human developments that literally block the path as well as non-native species that can out-compete native plants and animals in new locations or make those areas uninhabitable. For example, there is evidence that certain butterflies, often a species that is used to indicate the health of an ecosystem, are moving further north, and are seldom seen in the southern reaches of their range. In addition, warmer temperatures have enabled the Jeffrey pine beetle to have more than one birth cycle per season, lengthening the amount of time this pest is able to damage trees (USC, 200 Pg 1-6). Furthermore, human impact other than greenhouse gas emissions will exacerbate challenges to ecosystems attempting to reestablish at higher elevations or new locations. According to the UCS report, "In many parts of California, fragmentation of the landscape by human developments, invasions by nonnative species, and air pollution may limit the reestablishment of native ecosystems." (UCS, 200 Pg 1-6).

Impacts to California

While it is a global problem, influenced by an array of interrelated factors, climate change is also a regional and local problem, with serious impacts foreseen for California, the Southern California Area.

The impacts of climate change will be variable and widespread. Global and local climate change will impact weather, sea-level rise, water resources, ecosystems, human health, economy, and infrastructure.

Projected future climate change may affect California in a variety of ways. Public health can suffer due to greater temperature extremes and more frequent extreme weather events, increases in transmission of infectious disease, and increases in air pollution. Agriculture is especially vulnerable to altered temperature and rainfall patterns, and new pest problems. Forest ecosystems would face increased fire hazards and would be more susceptible to pests and diseases. The Sierra snowpack that functions as the state's largest reservoir could shrink by one third by 2060, and to half its historic size by 2090. Runoff that fills reservoirs will start in midwinter, not spring, and rain falling on snow will trigger more flooding. The California coast is likely to face a rise in sea level that could threaten its shorelines. Sea level rise and storm surges could lead to flooding of low-lying property, loss of coastal wetlands, erosion of cliffs and beaches, saltwater contamination of drinking water, and damage to roads, causeways, and bridges Figure 1-3 illustrates potential impacts from global warming on California (2070-2099).

Projected Global Warming Impact on California 2070-2099 (as compared with 1961-1990) /12 90% loss in Sierra snowpack 22-30 inches of sea level rise Business as Usual Emissions (8-10.5°F) 3-4 times as many heat wave days 70-80% loss in Sierra snowpack Medium-High Emissions 14-22 inches of sea level rise (5.5-8°F) 2.5-4 times as many heat wave days Lower Emissions 30-60% loss in Sierra snowpack (Governor's 2050 target) (3-5.5°F) 6-14 inches of sea level rise 2-2.5 times as many heat wave days Our Changing Climate: Assessing the Risks to California (2006), www.climatechange.ca.gov

Figure A- 3 – Projected Global Warming Impacts on California (2070-2099)

Climate and Weather

There is a key difference between climate and weather. According to the National Science Foundation report on climate change in California, "Weather is the day-to-day phenomena we experience—sun, rain, fog, warm, cold, wind—that vary greatly. Climate is long term statistical patterns of weather...and is reflected in average temperatures, rainfall, and other weather events at a given location, and climate change is signaled by long-term changes in those averages" (CRA, 2002).

In 1999, the Union of Concerned Scientists and the Ecological Society of America published a report called *Confronting Climate Change in California*, which describes the predicted impacts of climate change in California. According to this report, California has had a 2 °F increase in temperature over the past 100 years, and annual precipitation has decreased by 10-25% in some regions The report also noted that most climate change models predict a temperature increase of 4° F in California in the next 20 to 40 years. These models also projected a decrease in the

number of long dry spells, and an annual precipitation increase of 20-30% (with a range of 10-50%) in spring and fall, with somewhat larger increases in winter. One model reveals a large increase in precipitation over California, particularly in the form of rain, but with dry areas to the east of the Sierra. This regional model projects that winter precipitation over the coastal areas and the Sierra will increase by 25% or more, with an associated risk of increases in winter mud slides and flooding (UCS, 1999).

Much of the anticipated changes in climate will depend on the frequency and strength of the El Niño-Southern Oscillation phenomenon (ENSO). Most global climate change models indicate the possibility of more frequent ENSO events. El Niño historically happens every two to seven years off the west coast of South America, as a result of changes in ocean currents and prevailing winds over the Pacific Ocean. These changes bring warm water from the western oceans, displacing the nutrient-rich cold water that normally wells up on the western coasts of the Americas from deep in the ocean. These changes bring more frequent and extreme weather anomalies, including severe droughts and floods, hurricanes and winter storms. According to the National Science Foundation, "the invasion of warm water disrupts both the marine food chain and the economies of coastal communities that are based on fishing and related industries" (CAR, 2002). The effects of El Niño in California vary across the state, but in the past have included abnormally frequent winter rains and storms, and abnormally dry summers and associated wildfires (UCS, 1999). The 1982-83 El Niño, the strongest event in recorded history, brought \$8 billion in economic impacts and \$100 million in California alone (CAR, 2002).

Water Resources

Climate change impacts will bring an additional burden to California's already over-taxed water supply system. According to the IPCC there will be an increase in the number of intense precipitation days and flood frequencies in basins driven by snowmelt, such as California's Central Valley (IPCC, 2001). For this type of basin, the accumulation of snow in winter is the essential "water tower" that stores water until the spring's warmer temperatures begins to melt the snow, forming the streams and rivers that supply the entire watershed with water for the duration of the summer.

Even under normal climatic conditions, 80% of California's annual rainfall occurs in the winter and is stored in the snowpacks of the various mountain ranges (UCS, 2005). The warmer temperatures associated with climate change will increase rainstorms and decrease snowstorms, shorten the overall snowfall season, and accelerate the rate of spring snowmelt, ultimately leading to more rapid, earlier, and greater spring runoff (Frederick, 1999). The anticipated early spring floods are likely to be followed by excessively dry summers.

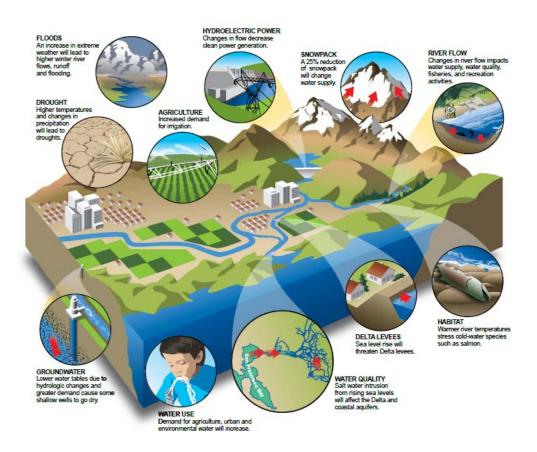
California's water supply is already under stress. According to the National Science Foundation report on climate change in California, "Every major water supply source in California is [decreasing in capacity and] currently over-allocated (CRA, 200 Pg 1-5). A combination of natural and human activities is causing this depletion of California water supplies as well as water intrusion and chemical contamination. According to the Union of Concerned Scientists (UCS), 95% of the state's wetlands have already been destroyed.

In the past, California Water Resources on a statewide basis has allowed California to meet most of its agricultural and urban water management objectives and flood management objectives in most years. Generally, during a single dry year or two, surface and groundwater storage can maintain most water deliveries, but can result in critically low water reserves. Longer droughts can create numerous problems, including extreme fire danger, economic harm to urban and rural communities, loss of crops, and the potential for species collapse and degraded water quality in some regions. Water demand in California is already increasing because of population expansion. In addition, demand for water for irrigation rises with warmer temperatures. Summers with higher temperatures and even less rainfall and runoff than usual will exacerbate demands for water in California

Climate change magnifies the problems that exist with an aging water infrastructure and growing population. While recent bond measures have provided a down payment for improving California's water and flood systems, climate change presents an ongoing risk that requires a long-term commitment of funding that is properly matched to anticipated expenditures, beneficiaries and responsible parties.

Figure A-4 – How Climate Change Impacts a Watershed

How climate change impacts a watershed



Source: California Department of Water Resources 2008

APPENDIX B: MODELING COEFFICIENTS AND DATA ASSUMPTIONS

Greenhouse Gas Emission Inventory Modeling Coefficients and Data Assumptions

Standard

0.85 backcasting multiplier
2204.6226 lbs / metric ton
1000 kg/metric ton
1000000 g/metric ton
0.907 metric tons/short ton
2000 lbs/ton
2204.6226 lbs/metric ton
0.0283 m3/ft3
365.25 days/year
0.000001 metric ton/g
748 gal/ccf
325,851 gal/acre-foot

GWP

21 CH4 310 N2O

Transportation

On-Road Vehicles

8.81 kg/gallon CO₂ Gasoline 10.15 kg/gallon CO₂ Diesel 121 MJ/gallon gasoline 138 MJ/gallon Diesel Source: California Climate Action Registry General Reporting Protocol, Version 3.1 January 2009 (Table C.3)

Aviation Fuel

8.32 kg/gallon CO_2 7.04 gr/gallon CH_4 0.11 gr/gallon N_2O

Source: California Climate Action Registry General Reporting Protocol, Version 3.1 January 2009 (Table C.6)

2009 (Table

Electricity

CARB report Clearwater Emissions

46323.73 metric tons 46323730 kg

47.51745272 kg CO2/MMBTU

SCE Emission Factors

Default (2005) 665.2607 lbs CO2/MWh 7.5986 lbs CH4/GWh 11.3094 lbs N2O/GWh Source: EPA Emissions and Generation Resource Integrated Database (eGRID2007), Version 1.1, December 2007.

Natural Gas

53.06 kg CO2/MMBTU 5 g CH4/MMBTU 0.1 g N2O/MMBTU 1000 scf = 1Mcf 0.9649 Mcf/MMBTU 10 therms/mmbtu Source: California Climate Action Registry General Reporting Protocol, Version 3.1 January

2009 (Table C.7)

Area Sources: Landscaping and Woodburning Emissions

Multifamily

24.55 Acres/property
0.25 tons/property/day
0.010183299 tons/acre/day
24.44 units/acre
0.000416665 tons/unit/day

Single Family

0.0193 tons/acre/day 3 units/acre 0.00643333 tons/unit/day Non Residential

2*sqft=acreage 43560 sqft=1 acre 21780 sqft/acre 0.010183299 tons/acre/day 4.67553E-07 tons/sqft/day

Source: URBEMIS2007 Emissions Estimation for Land Use Development Projects, Version 9.2

Wood Burning Coefficients and Conversions:

3400 lbs CO2/ton wood 2458 lbs in a cord of wood 316 g CH4/MMBTU 4.2 g N2O/MMBTU 15.38 MMBTU/ton wood Source: EPA AP-42 Emission Coefficients, Fifth Edition, Volume I October 1996 (Section 1.10)

Water and Waste Water

kWh/MG	Indoor Us	es	Outdo	or Uses
	NorCal	SoCal	NorCal	SoCal
	2117	9727	2117	9727
Water Supply				
and Conveyance				
	111	. 111	111	111
Water Treatment				
Water	1272	1272	1272	1272
Distribution				
Wastewater			0	0
Treatment	1911	. 1911		
Regional Total	5,411	13,021	3,500	11,110

Source: California Energy Commissions Refining Estimates of Water-Related Energy Use in California, December 2006 (Table ES-

Wastewater Coefficients

Stationary Methane Emissions

662 g/m3	Density CH4 at standard conditions
0.99	CH4 Destruction Efficiency

Source: Local Government Operations Protocol, Version 1.0, September 2008 (Chapter 10: Wastewater Treatment Facilities)

Process CH4

0.000003785	I/MG	Conversion
0.6	kgCH4/kgBOD remove	CH4 producing capacity (Bo)
0.8	(For anaerobic systems	CH4 Correction Factor
365.25	days/year	Conversion
0.001	metric tons/kg	Conversion

Solid Waste

metric tons CH₄/ton

waste

Landfill w/o recovery 3.1 Landfill w/ Flaring 0.64 Landfill w/ electric gen 0.3

Source: EPA Solid Waste Management and Greenhouse Gases; A life-cycle assessment of emissions and Sinks, 3rd edition, September 2006.

Agriculture

0.678	Density of Methane (kg/m³)		
0.404694456	# of hectares/acre	Source:	EPA State Inventory Tool for Agriculture, July 2008.
0.005	Ratio CH ₄ -C		
1.33	Conversion CH ₄ -C to Full Mol. Wt.		
0.001	Emission factor for liquid systems (kg N ₂ O-N/kg N)		
0.02	Emission factor for solid systems (kg N ₂ O-N/kg N)		
1.57	Ratio $N_2O:N_2[C_{10}]$		
0.2	Volitazition percent for all non-PRP ag soils		
0	Volitazition percent for manure management		
0.01	Rate NH ₃ -NO _X		
0.02	Emission Factor for pastures, ranges, and paddocks		
0.0125	Emission factor for ground application		
100	Cwt (hundred weight) = 100 lbs		
0.1	Volitazition of synthetic fertilizers		
0.2	Volitazition of organic fertilizers		
0.3	% leached from soils		
0.025	Leaching Factor (kg N ₂ O-N / kg N)		
0.041	Nitrogen Content of Non-manure Organics		
0.01	Emission factor for soils (kg N2O-N/kgN)		
0.01	N ₂ O Emissions from Volitazition		
0.03	N content of aboveground biomass for N-fixing crop production		
8	Emission Factor for Temperate zone Histols (kg N2O-N / ha_yr)		
12	Emission Factor for Subtropic zone Histols (kg N ₂ O-N / ha_yr)		
0.007	N ₂ O-N Emissions Ratio [R _{N20_N}]		
0.65	% of target year applied		
0.35	% of following year applied		
480	Cotton (lbs/bale)		
0.40%	average population growth per year		

APPENDIX C: DATA INPUTS

Greenhouse Gas Emission Inventory Annual Usage and Generation

Inventory Year: 2008

2008 to 2020 Growth Rates

Residential	5.74%
Commercial	22.11%
Industrial	22.11%

Transportation

On-road Transportation

Annual Vehicle Miles Traveled	1,557,142,527
Annual Residential Trips	43,643,591
Annual Non-Residential Trips	26,343,596
Average \$/gallon Gasoline:	3.516
Average \$/gallon Diesel:	3.925

Aviation

Annual Gallons of fuel used: 180,228

Electricity and Natural Gas

Electricity

Socal Edison Electricity

Rate Code	Annual kWh	\$/kWh	\$
AG TOU	11,059,573	\$0.09971	\$1,102,802.37
Domestic	381,049,111	\$0.11999	\$45,721,681.51
GS-1	52,740,363	\$0.15607	\$8,231,299.60
GS-2	202,403,495	\$0.08507	\$17,218,260.69
PA-1	2,233,003	\$0.13582	\$303,283.75
PA-2	7,541,351	\$0.08876	\$669,358.63
Street Lighting	12,056,735	\$0.08405	\$1,013,428.54
TOU-8	325,916,689	\$0.09011	\$29,367,168.07
TOU-GS	126,399,954	\$0.17425	\$22,025,199.64
TOTAL	1.121.400.274		\$125,652,482,80

SoCal Edison Emission Factors		
Default (2005) Units		
665.2607	lbs CO2/MWh	
7.5986	lbs CH4/GWh	
11.3094	lbs N2O/GWh	

2005 California Emission Factors		
Default (2005) Units		
724.12 lbs CO2/MW		
30.24	lbs CH4/GWh	
8.08	lbs N2O/GWh	

Corona Department of Water and Power

Annual kWh	
	167,007

CAISO Emission Factors		
Default (2005)	Units	
612.12	lbs CO2/MWh	
31.41	lbs CH4/GWh	
6.37	lbs N2O/GWh	

Natural Gas

TOTAL

	Mcf	\$/Mcf
Residential	1715192.8	\$12.75
Commercial	3159014.5	\$10.20
Industrial	2089176	\$9.07
	6062292 2	\$72 020 492 42

Clearwater Power Plant Generation

Generation	107,711	MWh
Natural Gas Use		Mcf
Reported CO2 Emissions	46,323.73	metric tons

Area Source Emissions: Landscaping and Woodburning Emissions

Landscaping Emissions

Land use:

Single Family Residential Units:	33,809	units
Multi-family Residential Units:	10,063	units
Commercial Building Space:		1000 square feet
Industrial Building Space:	29,161	1000 square feet

Woodburning Emissions

Homes with wood stoves:	35%	% of residential homes
Amount of wood burned:	0.80	cords/unit
Homes with fireplaces:	10%	% of residential homes
Price of wood:	\$3.50	\$/cord of wood

Water and Waste Water

Metered Water Deliveries

	CCf	\$/CCf
Agriculture	11	\$1.45
Commercial	1,696,101	\$1.69
Government	1,168,901	\$1.69
Industrial	635,409	\$1.69
Landscape	1,738,342	\$1.69
Multifamily	1,223,358	\$1.69
Reclaimed Water	1,324,433	\$1.33
Single Family	10,602,768	\$1.69
TOTAL	18,389,323	

Total Water Into the System

	million gal
Wells	8,347.396
Treated State Water Project	2,448.477
Raw Colorado River Water	3,953.783
Recycled	1,421.636
TOTAL	16,171.292

Wastewater

Digester Gas	57,458	cubic feet/day
Fractionof methane in Gas	0.63	
BOD Load (influent)	11.13	(mg/l/day)
Total Influent	9.55	MG/day
Fraction ROD removed	0.99	

Solid Waste

		Mileage	(round			Entity Owned/
Waste Disposal Sites	Name	trip)*		Annual Waste (tons)	Methane Recovery Type	Operated?
Landfill 1	El Sobrante	24		132807.36	Gas-to-Energy	No

^{*}Distance from center of area to facilities outsied the city boundaries. For facilities within entity boundaries, use the average trip milage for all trips.

Agriculture

Annual Crop Growth

	Acres Harvested	Annual Yield (tons)
Fruit Trees	100	-

APPENDIX D: GHG INVENTORY CALCULATIONS

Greenhouse Gas Emission Inventory Climate Action Plan Comparison Summary

	2000	2020	Reduced	
	2008	2020	2020	
	Transportation			
Mobile Source Emissions	831,356	957,720	704,233	
Aviation Fuel	1,532	1,532	1,532	
Sub Total	832,888	959,252	705,765	
	Energy			
Electrical Consumption	369,974	430,368	246,778	
Electrical Generation	46,456	0	0	
Natural Gas	383,899	453,286	422,775	
Sub Total	800,329	883,655	669,553	
	Area Sources	S		
Landscaping	43,616	46,850	46,850	
Woodburning	32,305	35,372	27,459	
Sub Total	75,922	82,221	74,309	
Wa	ter and Waste	water		
Water consumption	20,633	21,972	14,271	
Wastewater Generation	5,150	5,484	4,387	
Sub Total	25,783	27,456	18,659	
	Solid Waste			
Haul Trucks	512	540	403	
Landfill Offgasing	39,842	45,389	33,815	
Sub Total	40,354	45,929	34,217	
Agriculture				
Animals and Runoff	31	31	31	
Fertilizer Use	47	47	47	
Crop Growth	158	158	158	
Sub Total	236	236	236	
TOTAL	1,775,511	1,998,749	1,502,739	

Source	2008	2020 BAU	2020 Reduced
Transportation	832,888	959,252	705,765
Energy	800,329	883,655	669,553
Area Sources	75,922	82,221	74,309
Water and Wastewater	25,783	27,456	18,659
Solid Waste	40,354	45,929	34,217
Agriculture	236	236	236
Total	1,775,511	1,998,749	1,502,739

Greenhouse Gas Emission Inventory 2008 Emission Inventory

	CO ₂	CH₄	N ₂ O	Total MT CO₂e	Annual Cost				
		Transporta	ition						
Mobile Source Emissions	789,788	5,404	33,254	828,446	\$388,984,511				
HFC's from mobile sources	-	-	-	2,910					
Aviation Fuel	1,499	27	6	1,532					
Sub Total	791,288	5,430	33,260	832,888	\$388,984,511				
		Energy	1						
Electrical Consumption	287,671	69	1,516	289,256	\$125,652,483				
Electrical Generation	39,375	87	26	39,488	\$0				
Natural Gas	325,480	644	190	326,314	\$73,039,482				
Sub Total	652,526	800	1,732	655,058	\$198,691,965				
Area Sources									
Landscaping	37,074	-	-	37,074					
Woodburning	25,445	1,684	330	27,459	\$55,279				
Sub Total	62,519	1,684	330	64,533	<i>\$55,279</i>				
	V	Water and Was	stewater						
Water consumption	17,462	15	60	17,538	\$30,594,535				
Wastewater Generation	-	208	-	208					
Sub Total	17,462	224	60	17,746	\$30,594,535				
		Solid Was	ste						
Haul Trucks	511	0	0	512					
Landfill Offgasing	-	39,842	-	39,842					
Sub Total	511	39,842	0	40,354					
		Agricultu	ire						
Animals and Runoff	-	-	31	31					
Fertilizer Use	-	-	47	47					
Crop Growth	-	-	158	158					
Sub Total	0	0	236	236					
Total	1,524,307	47,981	35,619	1,610,816	\$618,326,290				

CITY OF CORONA Greenhouse Gas Emission Inventory

Transportation Emissions

	Transportat	tion			
					Reduced
Target Year:	2008	1990	2008	2020	2020
Operational Emissions for CO ₂ (MTCO ₂ e/year) ¹ :	789,788.33	747,520.64	789,788.33	909,833.79	849,190.33
Pavley Regulation Adjustment (CO ₂ metric tons/year) ² :	789,788.33	747,520.64	789,788.33	772,411.91	720,928.08
CH₄(MTCO₂e/year):	5,403.81	5,114.61	5,403.81	24,090.02	4,932.67
N ₂ O (MTCO ₂ e/year):	33,254.25	31,474.55	33,254.25	148,246.30	30,354.87
HFCs (MTCO ₂ e/year):	2,909.75	2,754.02	2,909.75	12,971.55	2,656.05
US EPA Adjustment (CO₂e metric tons/year)³:	831,356.13	786,863.83	831,356.13	957,719.78	758,871.66
Low Carbon Fuels Rule Adjustment (CO₂e metric tons/year) ⁴ :	831,356.13	786,863.83	831,356.13	957,719.78	704,232.90
Avaition Fuel Use ⁵ :	1,532.29	1,532.29	1,532.29	1,532.29	1,532.29
Total (CO₂e metric tons/year):	832,888.42	788,396.12	832,888.42	959,252.07	705,765.19
Cost per year (\$) ⁶ :					

1 Emissions of CO₂ from motorvehicle usage was determined from the running and start emissions as taken from EMFAC2007 and is based on vehicle and fuel type. Start Emission fractions and % by residential vs non-residnetial land uses were determined from URBEMIS defaults. Total Annual VMT, Total Residential Trips, and Total Non-residential trips were determined from the traffic information provided by LSA.

	Target Year		2008	
				Emissions
Running Emissions LDA NCAT CAT DSL LDT1 NCAT CAT		% Vehicle Type	VMT	(MT CO ₂)
LDA	NCAT	0.30030%	4676103.685	2,196.08
	CAT	44.4444%	692063345.3	235,790.13
	DSL	0.10010%	1558701.228	560.30
LDT1	NCAT	0.20020%	3117402.456	1,465.31
	CAT	9.30931%	144959214.2	61,469.09
	DSL	0.60060%	9352207.369	3,239.94
LDT2	NCAT	0.10010%	1558701.228	733.25
	CAT	21.92192%	341355569	144,764.12
	DSL	0.00000%	0	0.00
MDV	NCAT	0.10010%	1558701.228	904.15
	CAT	11.81181%	183926744.9	106,762.85
	DSL	0.10010%	1558701.228	540.00
LHD1	NCAT	0.00000%		0.00
	CAT	1.50150%	23380518.42	13,277.68
	DSL	0.50050%	7793506.141	4,050.28
LHD2	NCAT	0.00000%		0.00
	CAT	0.30030%	4676103.685	2,655.54
	DSL	0.30030%	4676103.685	2,471.92
MHD	NCAT	0.00000%		0.00
	CAT	0.20020%	3117402.456	1,770.36
	DSL	0.90090%	14028311.05	21,112.61
HHD	NCAT	0.00000%		0.00
	CAT	0.10010%	1558701.228	885.18
	DSL	5.60561%	87287268.78	167,961.13
OBUS	NCAT	0.00000%		0.00
	CAT	0.00000%	0	0.00
	DSL	0.00000%	0	0.00
SBUS	NCAT	0.00000%		0.00
	CAT	0.00000%	0	0.00
L	DSL	0.10010%	1558701.228	2,345.85
UBUS	NCAT	0.00000%		0.00
	CAT	0.00000%	0	0.00
L	DSL	0.00000%	0	0.00
MH	NCAT	0.00000%		0.00
	CAT	0.30030%	4676103.685	2,655.54
L	DSL	0.10010%	1558701.228	2,345.85
MCY	NCAT	0.80080%	12469609.83	1,511.64
	CAT	0.30030%	4676103.685	646.85
L	DSL	0.00000%	0	0.00
Tot	tal		1,557,142,527.02	782,115.62

Start	ing emissions	2008						
	Residential	Trips	5	10	20	30	40	50
LDA	NCAT	218217.9574	0.82	1.60	2.40	3.18	2.77	2.53
	CAT	18941318.7	6.56	14.42	26.27	40.41	39.99	40.75
	DSL	43643.59147	0.00	0.00	0.00	0.00	0.00	0.00
LDT1	NCAT	87287.18295	0.33	0.64	0.96	1.27	1.11	1.01
	CAT	3666061.684	1.64	3.53	6.29	9.56	9.41	9.58
	DSL	261861.5488	0.00	0.00	0.00	0.00	0.00	0.00
LDT2	NCAT	43643.59147	0.16	0.32	0.48	0.64	0.55	0.51
	CAT	8510500.337	3.72	8.10	14.59	22.34	22.05	22.45
	DSL	0	0.00	0.00	0.00	0.00	0.00	0.00
MDV	NCAT	43643.59147	0.20	0.40	0.59	0.79	0.69	0.63
	CAT	4713507.879	2.83	6.16	11.08	16.95	16.73	17.04
	DSL	43643.59147	0.00	0.00	0.00	0.00	0.00	0.00
LHD1	NCAT	43643.59147	0.25	0.49	0.73	0.97	0.84	0.77
	CAT	2967764.22	1.88	4.44	8.70	13.81	13.86	14.20
	DSL	349148.7318	0.00	0.00	0.00	0.00	0.00	0.00
LHD2	NCAT	0	0.00	0.00	0.00	0.00	0.00	0.00
	CAT	567366.6891	0.33	0.82	1.67	2.69	2.71	2.78
	DSL	261861.5488	0.00	0.00	0.00	0.00	0.00	0.00
MHD	NCAT	87287.18295	0.50	0.98	1.47	1.94	1.69	1.54
	CAT	392792.3233	0.13	0.45	1.17	2.05	2.14	2.22
	DSL	1047446.195	0.00	0.00	0.00	0.00	0.00	0.00
HHD	NCAT	0	0.00	0.00	0.00	0.00	0.00	0.00
	CAT	87287.18295	0.03	0.10	0.26	0.46	0.47	0.49
	DSL	480079.5062	0.00	0.00	0.00	0.00	0.00	0.00
OBUS	NCAT	0	0.00	0.00	0.00	0.00	0.00	0.00
	CAT	130930.7744	0.04	0.15	0.39	0.68	0.71	0.74
	DSL	43643.59147	0.00	0.00	0.00	0.00	0.00	0.00
SBUS	NCAT	0	0.00	0.00	0.00	0.00	0.00	0.00
	CAT	0	0.00	0.00	0.00	0.00	0.00	0.00
	DSL	43643.59147	0.00	0.00	0.00	0.00	0.00	0.00
UBUS	NCAT	0	0.00	0.00	0.00	0.00	0.00	0.00
	CAT	0	0.00	0.00	0.00	0.00	0.00	0.00
	DSL	0	0.00	0.00	0.00	0.00	0.00	0.00
MH	NCAT	0	0.00	0.00	0.00	0.00	0.00	0.00
	CAT	0	0.00	0.00	0.00	0.00	0.00	0.00
	DSL	0	0.00	0.00	0.00	0.00	0.00	0.00
MCY	NCAT	436435.9147	0.51	0.99	1.49	1.97	1.72	1.57
	CAT	130930.7744	0.01	0.03	0.07	0.13	0.14	0.14
	DSL	0	0.00	0.00	0.00	0.00	0.00	0.00
Tot	:al	43,643,591.47						

LDT1	Residential	60	120	180	240	300	360	420
LDT2	NCAT	1.89	2.60	3.48	3.24	3.10	3.10	3.12
LDT2	CAT	33.69	72.49	111.14	116.36	123.42	135.34	147.97
LDT2	DSL	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NCAT	0.76	1.04	1.39	1.30	1.24	1.24	1.25
	CAT	7.92	17.38	26.58	27.79	29.46	32.30	35.32
	DSL	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NCAT	0.38	0.52	0.70	0.65	0.62	0.62	0.63
• • • • •	CAT	18.56	40.31	61.74	64.60	68.49	75.10	82.12
	DSL	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MDV	NCAT	0.47	0.64	0.86	0.80	0.77	0.77	0.77
	CAT	14.09	30.61	46.87	49.04	52.00	57.02	62.34
	DSL	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LHD1	NCAT	0.58	0.79	1.06	0.99	0.94	0.94	0.95
	CAT	11.73	23.89	36.88	38.76	41.19	45.19	49.38
	DSL	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LHD2	NCAT	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	CAT	2.30	4.57	7.07	7.45	7.92	8.69	9.50
	DSL	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MHD	NCAT	1.15	1.59	2.12	1.97	1.89	1.89	1.90
	CAT	1.83	3.17	5.00	5.32	5.68	6.25	6.81
	DSL	0.00	0.00	0.00	0.00	0.00	0.00	0.00
HHD	NCAT	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	CAT	0.41	0.70	1.11	1.18	1.26	1.39	1.51
	DSL	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OBUS	NCAT	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l	CAT	0.61	1.06	1.67	1.77	1.89	2.08	2.27
l	DSL	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SBUS	NCAT	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l	CAT	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l	DSL	0.00	0.00	0.00	0.00	0.00	0.00	0.00
UBUS	NCAT	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	CAT	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l	DSL	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MH	NCAT	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l	CAT	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l	DSL	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MCY	NCAT	1.17	1.61	2.16	2.01	1.92	1.92	1.94
	CAT	0.12	0.20	0.32	0.34	0.36	0.40	0.43
İ	DSL	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total								

	Residential	480	540	600	660	720	MTCO ₂
LDA	NCAT	3.10	3.13	3.13	3.13	3.13	49.43
	CAT	158.39	170.64	181.58	192.26	202.67	1814.35
	DSL	0.00	0.00	0.00	0.00	0.00	0.00
LDT1	NCAT	1.24	1.25	1.25	1.25	1.25	19.79
	CAT	37.83	40.78	43.44	46.04	48.59	433.43
	DSL	0.00	0.00	0.00	0.00	0.00	0.00
LDT2	NCAT	0.62	0.63	0.63	0.63	0.63	9.90
	CAT	87.92	94.75	100.87	106.86	112.71	1007.30
	DSL	0.00	0.00	0.00	0.00	0.00	0.00
MDV	NCAT	0.77	0.77	0.77	0.78	0.78	12.24
	CAT	66.75	71.94	76.59	81.13	85.58	764.73
	DSL	0.00	0.00	0.00	0.00	0.00	0.00
LHD1	NCAT	0.95	0.95	0.95	0.95	0.96	15.08
	CAT	52.78	56.74	60.22	63.56	66.76	603.99
	DSL	0.00	0.00	0.00	0.00	0.00	0.00
LHD2	NCAT	0.00	0.00	0.00	0.00	0.00	0.00
	CAT	10.14	10.90	11.55	12.17	12.76	116.03
	DSL	0.00	0.00	0.00	0.00	0.00	0.00
MHD	NCAT	1.89	1.91	1.91	1.91	1.91	30.16
	CAT	7.25	7.74	8.14	8.50	8.83	82.66
	DSL	0.00	0.00	0.00	0.00	0.00	0.00
HHD	NCAT	0.00	0.00	0.00	0.00	0.00	0.00
	CAT	1.61	1.72	1.81	1.89	1.96	18.37
	DSL	0.00	0.00	0.00	0.00	0.00	0.00
OBUS	NCAT	0.00	0.00	0.00	0.00	0.00	0.00
	CAT	2.42	2.58	2.71	2.83	2.94	27.55
	DSL	0.00	0.00	0.00	0.00	0.00	0.00
SBUS	NCAT	0.00	0.00	0.00	0.00	0.00	0.00
	CAT	0.00	0.00	0.00	0.00	0.00	0.00
	DSL	0.00	0.00	0.00	0.00	0.00	0.00
UBUS	NCAT	0.00	0.00	0.00	0.00	0.00	0.00
	CAT	0.00	0.00	0.00	0.00	0.00	0.00
	DSL	0.00	0.00	0.00	0.00	0.00	0.00
МН	NCAT	0.00	0.00	0.00	0.00	0.00	0.00
	CAT	0.00	0.00	0.00	0.00	0.00	0.00
	DSL	0.00	0.00	0.00	0.00	0.00	0.00
MCY	NCAT	1.93	1.94	1.94	1.94	1.95	30.69
	CAT	0.46	0.49	0.51	0.54	0.56	5.23
	DSL	0.00	0.00	0.00	0.00	0.00	0.00
Tot							5,040.95

Non Residential Trips 5 10 20 30 LDA NCAT 131717.9805 0.87 1.65 1.49 1.77 CAT 11433120.71 6.94 14.90 16.26 22.54 DSL 26343.5961 0.00 0.00 0.00 0.00 LDT1 NCAT 52687.1922 0.35 0.66 0.60 0.71 CAT 2212862.072 1.74 3.65 3.89 5.33 DSL 158061.5766 0.00 0.00 0.00 0.00 0.00 LDT2 NCAT 26343.5961 0.17 0.33 0.30 0.36 CAT 5137001.239 3.94 8.38 9.03 12.46 DSL 0 0.00 0.00 0.00 0.00 0.00 MDV NCAT 26343.5961 0.22 0.41 0.37 0.44 CAT 2845108.379 2.99 6.36 6.86 9.46	1.46 21.15 0.00 0.59 4.98 0.00 0.29 11.66 0.00 0.36 8.85 0.00 0.45	50 1.37 22.03 0.00 0.55 5.18 0.00 0.27 12.14 0.00 0.34 9.21
CAT 11433120.71 6.94 14.90 16.26 22.54 DSL 26343.5961 0.00 0.00 0.00 0.00 LDT1 NCAT 52687.1922 0.35 0.66 0.60 0.71 CAT 2212862.072 1.74 3.65 3.89 5.33 DSL 158061.5766 0.00 0.00 0.00 0.00 LDT2 NCAT 26343.5961 0.17 0.33 0.30 0.36 CAT 5137001.239 3.94 8.38 9.03 12.46 DSL 0 0.00 0.00 0.00 0.00 MDV NCAT 26343.5961 0.22 0.41 0.37 0.44	21.15 0.00 0.59 4.98 0.00 0.29 11.66 0.00 0.36 8.85 0.00	22.03 0.00 0.55 5.18 0.00 0.27 12.14 0.00 0.34 9.21
DSL 26343.5961 0.00 0.00 0.00 0.00 0.00 LDT1 NCAT 52687.1922 0.35 0.66 0.60 0.71 CAT 2212862.072 1.74 3.65 3.89 5.33 DSL 158061.5766 0.00 0.00 0.00 0.00 LDT2 NCAT 26343.5961 0.17 0.33 0.30 0.36 CAT 5137001.239 3.94 8.38 9.03 12.46 DSL 0 0.00 0.00 0.00 0.00 MDV NCAT 26343.5961 0.22 0.41 0.37 0.44	0.00 0.59 4.98 0.00 0.29 11.66 0.00 0.36 8.85	0.00 0.55 5.18 0.00 0.27 12.14 0.00 0.34 9.21
LDT1 NCAT 52687.1922 0.35 0.66 0.60 0.71 CAT 2212862.072 1.74 3.65 3.89 5.33 DSL 158061.5766 0.00 0.00 0.00 0.00 LDT2 NCAT 26343.5961 0.17 0.33 0.30 0.36 CAT 5137001.239 3.94 8.38 9.03 12.46 DSL 0 0.00 0.00 0.00 0.00 MDV NCAT 26343.5961 0.22 0.41 0.37 0.44	0.59 4.98 0.00 0.29 11.66 0.00 0.36 8.85 0.00	0.55 5.18 0.00 0.27 12.14 0.00 0.34 9.21
CAT 2212862.072 1.74 3.65 3.89 5.33 DSL 158061.5766 0.00 0.00 0.00 0.00 LDT2 NCAT 26343.5961 0.17 0.33 0.30 0.36 CAT 5137001.239 3.94 8.38 9.03 12.46 DSL 0 0.00 0.00 0.00 0.00 MDV NCAT 26343.5961 0.22 0.41 0.37 0.44	4.98 0.00 0.29 11.66 0.00 0.36 8.85 0.00	5.18 0.00 0.27 12.14 0.00 0.34 9.21
DSL 158061.5766 0.00 0.00 0.00 0.00 LDT2 NCAT 26343.5961 0.17 0.33 0.30 0.36 CAT 5137001.239 3.94 8.38 9.03 12.46 DSL 0 0.00 0.00 0.00 0.00 MDV NCAT 26343.5961 0.22 0.41 0.37 0.44	0.00 0.29 11.66 0.00 0.36 8.85 0.00	0.00 0.27 12.14 0.00 0.34 9.21
LDT2 NCAT 26343.5961 0.17 0.33 0.30 0.36 CAT 5137001.239 3.94 8.38 9.03 12.46 DSL 0 0.00 0.00 0.00 0.00 MDV NCAT 26343.5961 0.22 0.41 0.37 0.44	0.29 11.66 0.00 0.36 8.85 0.00	0.27 12.14 0.00 0.34 9.21
CAT 5137001.239 3.94 8.38 9.03 12.46 DSL 0 0.00 0.00 0.00 0.00 MDV NCAT 26343.5961 0.22 0.41 0.37 0.44	11.66 0.00 0.36 8.85 0.00	12.14 0.00 0.34 9.21
DSL 0 0.00 0.00 0.00 0.00 0.00 MDV NCAT 26343.5961 0.22 0.41 0.37 0.44	0.00 0.36 8.85 0.00	0.00 0.34 9.21
MDV NCAT 26343.5961 0.22 0.41 0.37 0.44	0.36 8.85 0.00	0.34 9.21
	8.85 0.00	9.21
CAT 2845108.379 2.99 6.36 6.86 9.46	0.00	
2 23.0200.0.0 5.10		0.00
DSL 26343.5961 0.00 0.00 0.00 0.00	0.45	0.00
LHD1 NCAT 26343.5961 0.27 0.50 0.45 0.54		0.42
CAT 1791364.535 1.99 4.59 5.38 7.71	7.33	7.67
DSL 210748.7688 0.00 0.00 0.00 0.00	0.00	0.00
LHD2 NCAT 0 0.00 0.00 0.00 0.00 0.00	0.00	0.00
CAT 342466.7493 0.35 0.85 1.03 1.50	1.43	1.50
DSL 158061.5766 0.00 0.00 0.00 0.00	0.00	0.00
MHD NCAT 52687.1922 0.53 1.01 0.91 1.08	0.89	0.83
CAT 237092.3649 0.13 0.47 0.72 1.14	1.13	1.20
DSL 632246.3064 0.00 0.00 0.00 0.00	0.00	0.00
HHD NCAT 0 0.00 0.00 0.00 0.00	0.00	0.00
CAT 52687.1922 0.03 0.10 0.16 0.25	0.25	0.27
DSL 289779.5571 0.00 0.00 0.00 0.00	0.00	0.00
OBUS NCAT 0 0.00 0.00 0.00 0.00 0.00	0.00	0.00
CAT 79030.7883 0.04 0.16 0.24 0.38	0.38	0.40
DSL 26343.5961 0.00 0.00 0.00 0.00	0.00	0.00
SBUS NCAT 0 0.00 0.00 0.00 0.00 0.00	0.00	0.00
CAT 0 0.00 0.00 0.00 0.00 0.00	0.00	0.00
DSL 26343.5961 0.00 0.00 0.00 0.00	0.00	0.00
UBUS NCAT 0 0.00 0.00 0.00 0.00 0.00	0.00	0.00
CAT 0 0.00 0.00 0.00 0.00 0.00	0.00	0.00
DSL 0 0.00 0.00 0.00 0.00 0.00	0.00	0.00
MH NCAT 0 0.00 0.00 0.00 0.00 0.00	0.00	0.00
CAT 0 0.00 0.00 0.00 0.00 0.00	0.00	0.00
DSL 0 0.00 0.00 0.00 0.00 0.00	0.00	0.00
MCY NCAT 263435.961 0.54 1.03 0.92 1.10	0.91	0.85
CAT 79030.7883 0.01 0.03 0.05 0.07	0.07	0.08
DSL 0 0.00 0.00 0.00 0.00	0.00	0.00
Total 26,343,596.10		

	Non Residential	60	120	180	240	300	360	420
LDA	NCAT	1.13	1.50	3.61	3.82	1.23	1.23	1.24
	CAT	20.17	41.71	115.34	137.38	49.01	53.75	58.96
	DSL	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LDT1	NCAT	0.45	0.60	1.44	1.53	0.49	0.49	0.50
	CAT	4.74	10.00	27.59	32.81	11.70	12.83	14.07
	DSL	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LDT2	NCAT	0.23	0.30	0.72	0.77	0.25	0.25	0.25
	CAT	11.12	23.19	64.07	76.26	27.20	29.82	32.72
	DSL	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MDV	NCAT	0.28	0.37	0.89	0.95	0.30	0.30	0.31
	CAT	8.43	17.61	48.64	57.90	20.65	22.64	24.84
	DSL	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LHD1	NCAT	0.35	0.46	1.10	1.17	0.37	0.38	0.38
	CAT	7.03	13.75	38.28	45.77	16.36	17.95	19.68
	DSL	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LHD2	NCAT	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	CAT	1.38	2.63	7.34	8.80	3.15	3.45	3.78
	DSL	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MHD	NCAT	0.69	0.91	2.20	2.33	0.75	0.75	0.76
	CAT	1.10	1.82	5.19	6.28	2.26	2.48	2.71
	DSL	0.00	0.00	0.00	0.00	0.00	0.00	0.00
HHD	NCAT	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	CAT	0.24	0.40	1.15	1.40	0.50	0.55	0.60
	DSL	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OBUS	NCAT	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	CAT	0.37	0.61	1.73	2.09	0.75	0.83	0.90
	DSL	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SBUS	NCAT	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	CAT	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	DSL	0.00	0.00	0.00	0.00	0.00	0.00	0.00
UBUS		0.00	0.00	0.00	0.00	0.00	0.00	0.00
	CAT	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	DSL	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MH	NCAT	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	CAT	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	DSL	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MCY	NCAT	0.70	0.93	2.24	2.37	0.76	0.76	0.77
	CAT	0.07	0.12	0.33	0.40	0.14	0.16	0.17
	DSL	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Total							

N	on Residential	480	540	600	660	720	MTCO ₂
LDA	NCAT	1.24	1.25	1.25	1.25	1.29	28.64
	CAT	63.53	67.99	72.35	76.61	83.15	943.78
	DSL	0.00	0.00	0.00	0.00	0.00	0.00
LDT1	NCAT	0.50	0.50	0.50	0.50	0.51	11.47
	CAT	15.17	16.25	17.31	18.35	19.94	225.52
	DSL	0.00	0.00	0.00	0.00	0.00	0.00
LDT2	NCAT	0.25	0.25	0.25	0.25	0.26	5.74
	CAT	35.26	37.76	40.19	42.58	46.25	524.03
	DSL	0.00	0.00	0.00	0.00	0.00	0.00
MDV	NCAT	0.31	0.31	0.31	0.31	0.32	7.09
	CAT	26.77	28.66	30.52	32.33	35.11	397.84
	DSL	0.00	0.00	0.00	0.00	0.00	0.00
LHD1	NCAT	0.38	0.38	0.38	0.38	0.39	8.74
	CAT	21.17	22.61	23.99	25.32	27.39	313.96
	DSL	0.00	0.00	0.00	0.00	0.00	0.00
LHD2	NCAT	0.00	0.00	0.00	0.00	0.00	0.00
	CAT	4.07	4.34	4.60	4.85	5.24	60.29
	DSL	0.00	0.00	0.00	0.00	0.00	0.00
MHD	NCAT	0.76	0.76	0.76	0.76	0.78	17.47
	CAT	2.91	3.08	3.24	3.39	3.62	42.87
	DSL	0.00	0.00	0.00	0.00	0.00	0.00
HHD	NCAT	0.00	0.00	0.00	0.00	0.00	0.00
	CAT	0.65	0.69	0.72	0.75	0.80	9.53
	DSL	0.00	0.00	0.00	0.00	0.00	0.00
OBUS	NCAT	0.00	0.00	0.00	0.00	0.00	0.00
	CAT	0.97	1.03	1.08	1.13	1.21	14.29
	DSL	0.00	0.00	0.00	0.00	0.00	0.00
SBUS	NCAT	0.00	0.00	0.00	0.00	0.00	0.00
	CAT	0.00	0.00	0.00	0.00	0.00	0.00
	DSL	0.00	0.00	0.00	0.00	0.00	0.00
UBUS	NCAT	0.00	0.00	0.00	0.00	0.00	0.00
	CAT	0.00	0.00	0.00	0.00	0.00	0.00
	DSL	0.00	0.00	0.00	0.00	0.00	0.00
МН	NCAT	0.00	0.00	0.00	0.00	0.00	0.00
	CAT	0.00	0.00	0.00	0.00	0.00	0.00
	DSL	0.00	0.00	0.00	0.00	0.00	0.00
MCY	NCAT	0.77	0.77	0.77	0.77	0.80	17.78
	CAT	0.18	0.20	0.21	0.21	0.23	2.71
	DSL	0.00	0.00	0.00	0.00	0.00	0.00
То	tal						2,631.75

2

Emissions from light duty automobiles, light duty trucks, and medium duty vehicles will be reduced by the implementation of the Pavely regulations. The EMFAC emission factors do not take into account these emission reductions, therefore the additional reductions from this regulation are accounted for below.

8

		Don't Need to	Unadjusted Amount					
		Adjust this amt	Affected by Pavley	Adjusted	Adusted	Adusted	Adusted	Adjusted
		Not Affected by	LDA/ LDT1/ LDT2/					
		Pavley	MDV	LDA	LDT1	LDT2	MDV	4 totaled
	2008	88,367.92	701,420.40	353,471.70	79,688.93	174,368.85	93,890.92	701,420.40
	1990	112,762.85	634,757.78	377,867.58	85,132.22	138,899.94	32,858.05	634,757.78
	2008	88,367.92	701,420.40	353,471.70	79,688.93	174,368.85	93,890.92	701,420.40
	2020	112,594.20	797,239.59	318,149.83	71,614.02	176,393.32	93,660.55	659,817.71
Reduced	2020	105,089.42	744,100.91	296,944.08	66,840.70	164,636.11	87,417.76	615,838.66

Pavley Adjustment

					%	
	% LDA CO2	% LDT1 CO2	% LDT2 CO2	% MDV CO2	LDA/LDT1/LDT2/	
Year	Emissions	Emissions	Emissions	Emissions	MDV	% everything else
1990	50.55%	11.39%	18.58%	4.40%	84.92%	15.08%
2008	44.76%	10.09%	22.08%	11.89%	88.81%	11.19%
2009	45.10%	10.08%	21.86%	11.78%	88.81%	11.19%
2010	45.45%	10.09%	21.68%	11.59%	88.81%	11.19%
2011	45.30%	10.00%	21.80%	11.60%	88.70%	11.30%
2012	45.05%	9.99%	21.88%	11.59%	88.51%	11.49%
2013	44.86%	9.99%	21.98%	11.59%	88.41%	11.59%
2014	44.66%	9.89%	22.08%	11.59%	88.21%	11.79%
2015	44.41%	9.88%	22.16%	11.68%	88.12%	11.88%
2016	44.36%	9.79%	22.18%	11.69%	88.01%	11.99%
2017	44.26%	9.79%	22.18%	11.69%	87.91%	12.09%
2018	44.16%	9.79%	22.18%	11.69%	87.81%	12.19%
2019	44.06%	9.69%	22.28%	11.69%	87.71%	12.29%
2020	43.91%	9.68%	22.26%	11.78%	87.62%	12.38%

	% CO2			
	Reduction -	% CO2 Reduction -	% CO2 Reduction -	% CO2 Reduction
Year	LDA	LDT1	LDT2	MDV
1990	0.00%	0.00%	0.00%	0.00%
2008	0.00%	0.00%	0.00%	0.00%
2009	0.00%	0.00%	0.07%	0.08%
2010	0.35%	0.25%	0.45%	0.48%
2011	1.75%	1.34%	1.31%	1.29%
2012	4.07%	3.27%	2.60%	2.44%
2013	6.31%	5.26%	3.88%	3.61%
2014	8.48%	7.26%	5.17%	4.83%
2015	10.74%	9.38%	6.54%	6.17%
2016	12.96%	11.56%	7.94%	7.54%
2017	15.03%	13.58%	9.27%	8.88%
2018	16.94%	15.43%	10.54%	10.16%
2019	18.72%	17.13%	11.74%	11.40%
2020	20.37%	18.69%	12.89%	12.59%

3 U.S. EPA assumption that GHG emissions from other pollutants - CH4, N20, and hydrofluorcarbons (HFCs) from leaking air conditioners account for 5 percent of emissions from vehicles, after accounting for global warming potential of each GHG.

To account for methane and nitrous oxide emissions CO₂ emissions are multiplied by: 1.052631578947

-Methane is approximately 13% of emissions. 13.00%
-Nitrous Oxide is approximately 80% of emissions. 80.00%
-HFCs are approximately 7% of emissions. 7.00%

4 Emissions from motorvehicles will be reduced by the implementation of the Low Carbon Fuel Standards rule. The EMFAC emission factors do not take into account these emission reductions, therefore the additional reductions from this regulation are accounted for below.

Low Carbon Fuels Standards

	%		
	Reduction		
	Gasoline		
	and Diesel	% Reduction Tank	
Year	Fuel	to Wheels	
1990	0.00	0.00	
2008	0.00	0.00	
2009	0.00	0.00	
2010	0.00	0.00	
2010	0.00	0.00	Source:
2011	0.25	0.18	Final Regulation Order
2012	0.50	0.36	Subchapter 10. Climate Change
2013	1.00	0.72	Article 4. Regulations to Achieve Greenhouse Gas Reductions
2014	1.50	1.08	Subarticle 7. Low Carbon Fuel Standard
2015	2.50	1.80	Section 95482. Average Carbon Intensity Requirements for Gasoline and Die
2016	3.50	2.52	
2017	5.00	3.60	
2018	6.50	4.68	
2019	8.00	5.76	
2020	10.00	7.20	

5 Emissions from aviation is based on the annual consumption of fuel used at the Airport.

Year	Annual Gallons	Metric Tons CO ₂	Metric Tons CH ₄	Metric Tons N ₂ O	MT CO ₂ e
2008	180,228	1,499.50	1.27	0.01983	1,532.29

6 This section estimates the cost per year for the miles traveled.

Greenhouse Gas Emission Inventory Electricity and Natural Gas Emissions

Electricity and Natural Gas

Electricity	2008	1990	2008	2020 BAU	2020 Reduced
CO2 metric tons/year:	338,436.95	287,671.41	338,436.95	393,682.93	225,742.29
CH4 metric tons/year:	3.87	3.29	3.87	4.50	2.58
N2O metric tons/year:	5.75	4.89	5.75	6.69	3.84
Total (CO2e metric tons/year):	340,301.63	289,256.39	340,301.63	395,852.00	226,986.07

	Natural Gas	2008	1990	2008	2020 BAU	2020 Reduced
	CO2 metric tons/year:	382,917.52	325,479.89	382,917.52	452,127.57	421693.933
	CH4 metric tons/year:	36.08	30.67	36.08	42.61	39.737
	N2O metric tons/year:	0.72	0.61	0.72	0.85	0.795
L	Total (CO2e metric tons/year):	383,898.99	326,314.14	383,898.99	453,286.43	422,774.79

Note: emissions for 1990 and 2020 are based on 2008 emission factors

Generation	2008	1990	2008	2020 BAU	2020 Reduced
CO2 metric tons/year:	46,323.73	39,375.17	46,323.73	0.00	0.000
CH4 metric tons/year:	4.87	4.14	4.87	0.00	0.000
N2O metric tons/year:	0.10	0.08	0.10	0.00	0.000
Total (CO2e metric tons/year):	46,456.31	39,487.87	46,456.31	0.00	0.00

Electricity

Southern California Edison

Rate Code	Annual kWh	\$/kWh	\$
AG TOU	11,059,573	\$0.09971	\$1,102,802.37
Domestic	381,049,111	\$0.11999	\$45,721,681.51
GS-1	52,740,363	\$0.15607	\$8,231,299.60
GS-2	202,403,495	\$0.08507	\$17,218,260.69
PA-1	2,233,003	\$0.13582	\$303,283.75
PA-2	7,541,351	\$0.08876	\$669,358.63
Street Lighting	12,056,735	\$0.08405	\$1,013,428.54
TOU-8	325,916,689	\$0.09011	\$29,367,168.07
TOU-GS	126,399,954	\$0.17425	\$22,025,199.64
TOTAL	1,121,400,274		\$125,652,482.80
2020 Total	1,304,481,154		

SoCal Edison	Emission Factors
665.2607	lbs CO2/MWh
7.5986	lbs CH4/GWh

11.3094 lbs N2O/GWh

Growth Factors 2008 to 2020 5.74%

22.11%

Residential Commercial

Industrial

Corona Department of Water and Power

Rate Code Annual kWh 167,007

CAISO Emission Factors				
612.12	lbs CO2/MWh			
31.41	lbs CH4/GWh			
6.37	lbs N2O/GWh			

Natural Gas

	Mcf	\$/Mcf
Residential	1715192.8	\$12.75
Commercial	3159014.5	\$10.20
Industrial	2089176	\$9.07
OTAL	6963383.3	\$73,039,482.42
2020	8221973.021	

107,711
940,660
46,323.73

Generation

Natural Gas Use (MMBTU)	2020 Natural Gas Use (MMBTU)
7216689.087	8521062.308

Natural Gas Use (MMBTU)	
974878.2257	

Greenhouse Gas Emission Inventory Area Source Emissions

Area Source Emissions: Landscaping and Woodburning Emissions

Landscaping	2008	1990	2008	2020 BAU	2020 Reduced
CO2 metric tons/year:	43,616.39	37,073.93	43,616.39	46,849.53	46,849.53

Woodburning	2008	1990	2008	2020 BAU	2020 Reduced
CO2 metric tons/year:	29,935.50	25,445.17	29,935.50	32,776.82	25,445.17
CH4 metric tons/year:	94.34	80.19	94.34	103.29	80.19
N2O metric tons/year:	1.25	1.07	1.25	1.37	1.07
Total (CO2e metric tons/year):	32,305.28	27,459.49	32,305.28	35,371.53	27,459.49

Landscaping Emissions

Land use:

	2008	2020	
Single Family Residential Units:	33,809	35,749	units
Multi-family Residential Units:	10,063	12,288	units
Commercial Building Space:	14,932	18,233	1000 square feet
Industrial Building Space:	29,161	35,607	1000 square feet

Woodburning Emissions

Homes with wood stoves:	35%	% of residential homes
Amount of wood burned:	0.80	cords/unit
Homes with fireplaces:	10%	% of residential homes
Price of wood:	\$3.50	\$/cord of wood

Note: Natural gas fired fireplaces accounted for in electricity and natural gas tab

Growth Factors 2008 to 2020			
5.74%	Residential		
22.11%	Commercial		
22.11%	Industrial		

Greenhouse Gas Emission Inventory Water and Wastewater Emissions

Water and Wastewater

Water - Electricity	2008	1990	2008	2020	2020
vvater - Electricity	2008	1990	2008	BAU	Reduced
CO2 metric tons/year:	20,543.75	17,462.19	20,543.75	21,877.46	14176.596
CH4 metric tons/year:	0.86	0.73	0.86	0.91	0.914
N2O metric tons/year:	0.23	0.19	0.23	0.24	0.244
Total (CO2e metric tons/year):	20,632.83	17,537.91	20,632.83	21,972.33	14271.4582

Wastewater	2008	2008 1990 2008 2020	2008	2020	2020
wastewater	2008	1990	2008	BAU	Reduced
CH4 metric tons/year:	245.22	208.44	245.22	261.14	208.915
Total (CO2e metric tons/year):	5,149.69	4,377.24	5,149.69	5,484.01	4387.20864

Metered Water Deliveries

	CCf	%	\$/CCf	Total \$
Agriculture	11	0.00%	\$1.45	\$15.95
Commercial	1,696,101	9.22%	\$1.69	\$2,866,410.69
Government	1,168,901	6.36%	\$1.69	\$1,975,442.69
Industrial	635,409	3.46%	\$1.69	\$1,073,841.21
Landscape	1,738,342	9.45%	\$1.69	\$2,937,797.98
Multifamily	1,223,358	6.65%	\$1.69	\$2,067,475.02
Reclaimed Water	1,324,433	7.20%	\$1.33	\$1,754,873.73
Single Family	10,602,768	57.66%	\$1.69	\$17,918,677.92
TOTAL	18,389,323			\$30,594,535.19
TOTAL (MG)	13,755,213,604			

Growth Factors 2008 to 2020			
5.74%	Residential		
22.11%	Commercial		
22.11%	Industrial		
22.11%	Industrial		

35.69% % Non-Residential 64.31% % Residential

Total Water Into the System

2008

	million gal	Additional kWh
Wells	8,347.396	N/A
Treated State Water Project	2,448.477	24,088,116
Raw Colorado River Water	3,953.783	38,458,452
Recycled	1,421.636	N/A
TOTAL	16,171.292	62,546,568.323
2020 Total	17,221.141	66,607,121.532

Wastewater

57,458.12	cubic feet/day
0.63	
	(mg/l/day)
9.55	MG/day
0.99	
	0.63 11.13 9.55

SoCal Edison Emission Factors								
665.2607 lbs CO2/MWh								
7.5986	lbs CH4/GWh							
11.3094	lbs N2O/GWh							

2005 California Emission Factors							
724.12	lbs CO2/MWh						
30.24	lbs CH4/GWh						
8.08	lbs N2O/GWh						

Stationary Methane Emissions 245.22 metric tons
Process Methane Emissions 7.05E-07 metric tons

Note: Additional kWh due to conveyence and treatment of State water, and conveyence of Colorado Water. All other conveyence and treatment of water emissions are included in Electricity section.

Greenhouse Gas Emission Inventory Solid Waste Emissions

Solid Waste									
					Reduced				
Target Year:	2008	1990	2008	2020	2020				
Truck Haul CO ₂ (CO ₂ e metric tons/year):	511.14	434.48	511.14	540.38	402.55				
Truck Haul CH_4 (CO_2 e metric tons/year):	0.03	0.00	0.03	0.00	0.00				
Truck Haul N ₂ O (CO ₂ e metric tons/year):	0.40	0.00	0.40	0.00	0.00				
Landfill Offgasing CH ₄ (CO₂e metric tons/year):	39,842.21	349,947.39	39,842.21	45,388.89	33,814.72				
Onsite Equipment CO_2 (CO_2 e metric tons/year):	0.00	0.00	0.00	0.00	0.00				
Onsite Equipment CH ₄ (CO ₂ e metric tons/year):	0.00	0.00	0.00	0.00	0.00				
Onsite Equipment N ₂ O (CO ₂ e metric tons/year):	0.00	0.00	0.00	0.00	0.00				
Total Solid Waste (CO ₂ e metric tons/year):	40,353.77	350,381.87	40,353.77	45,929.27	34,217.28				

Target Year	Target Year 2008				Hauling				
landfill /transfer station name	distance (round trip) (miles)	Waste tons/year	tons / truck	# trucks	Metric Tons/year CO ₂	Metric Tons/year CH ₄	Metric Tons/year N₂O	Methane Recovery type	off-gasing Metric Tons CH4
,			·		CO ₂	CII4	_		C114
0.00	0	0	12	0	0	0	0	N/A	
0.00	0	0	12	0	0	0	0	N/A	
El Sobrante	24	132,807	12	11068	511.138126	0.0013547	0.001275	0.30	39,842
0.00	0	0	12	0	0	0	0	0.00	0
0.00	0	0	12	0	0	0	0	0.00	0
0.00	0	0	12	0	0	0	0	0.00	0
Total					511.138126	0.0013547	0.001275		39,842

Target Year 1990					Hauling			Landfill Offgasing	
	distance				Metric	Metric	Metric	Methane	off-gasing
	(round trip)	Waste			Tons/year	Tons/year	Tons/year	Recovery	Metric Tons
landfill /transfer station name	(miles)	tons/year	tons / truck	# trucks	CO ₂	CH ₄	N ₂ O	type	CO ₂ e CH ₄
		0	12	0	0	0	0	N/A	
		0	12	0	0	0	0	N/A	
								No	
El Sobrante Landfill	24	112886.256	12	9408	434.476643	0.0011515	0.0010838	Recovery	349,947
								*Choose	
		0	12	0	0	0	0	Method*	0
								*Choose	
		0	12	0	0	0	0	Method*	0
								*Choose	
		0	12	0	0	0	0	Method*	0
Total					434.476643	0.0011515	0.0010838		349,947

Target Year	2008					Hauling		Landfi	II Offgasing
landfill /transfer station name	distance (round trip) (miles)	Waste tons/year	tons / truck	# trucks	Metric Tons/year CO ₂	Metric Tons/year CH ₄	Metric Tons/year N₂O	Methane Recovery type	off-gasing Metric Tons CH ₄
			12	0	0	0	0	N/A	
			12	0	0	0	0	N/A	
								Gas-to-	
El Sobrante Landfill	24	132807.36	12	11068	511.138126	0.0013547	0.001275	Energy	39,842
								Gas-to-	
			12	0	0	0	0	Energy	0
								Gas-to-	
			12	0	0	0	0	Energy	0
								Gas-to-	
			12	0	0	0	0	Energy	0
Total					511.138126	0.0013547	0.001275		39,842

Target Year	2020					Hauling		Landfi	ll Offgasing
landfill /transfer station name	distance (round trip) (miles)	Waste tons/year	tons / truck	# trucks	Metric Tons/year CO ₂	Metric Tons/year CH ₄	Metric Tons/year N ₂ O	Methane Recovery type	off-gasing Metric Tons CH ₄
			12	0	0	0	0	N/A	
			12	0	0	0	0	N/A	
								Gas-to-	
El Sobrante Landfill	24	151296.2984	12	12609	582.303996	0.0015433	0.0014526	Energy	45,389
								*Choose	
			12	0	0	0	0	Method*	0
								*Choose	
			12	0	0	0	0	Method*	0
								*Choose	
			12	0	0	0	0	Method*	0
Total					582.303996	0.0015433	0.0014526		45388.88951

Target Year	2020	Reduced			Hauling			Landfi	ill Offgasing
	diatamaa							Mathana	
	distance (round trip)	Waste			Metric	Metric	Metric	Methane Recovery	off-gasing
landfill /huanafay station name			tono / tonols	# *****	Tons/year	Tons/year	Tons/year	-	Metric Tons
landfill /transfer station name	(miles)	tons/year	tons / truck	# trucks	CO ₂	CH ₄	N ₂ O	type	CH ₄
			12	0	0	0	0	N/A	
			12	0	0	0	0	N/A	
								Gas-to-	
El Sobrante Landfill	24	112715.7423	12	9393	433.783919	0.0011497	0.0010821	Energy	33,815
								*Choose	
			12	0	0	0	0	Method*	0
								*Choose	
			12	0	0	0	0	Method*	0
								*Choose	
			12	0	0	0	0	Method*	0
Total			_		433.783919	0.0011497	0.0010821	_	33814.72269

EPA				
			Gas-to-	*Choose
	No Recovery	Flaring	Energy	Method*
Mixed Solid Waste	3.10	0.64	0.30	0.00
Emissions (from EMFAC2007, 30 mph for	Heavy-Heavy D	Outy Trucks, CO ₂ .	CH ₄ and N ₂ O f	rom CCAR)
	CO2	CH4	N2O	
Year	(grams/mile)	(grams/mile)	(grams/mile)	
1990	1,924.23	0.0051	0.0048	
2008	1,924.23	0.0051	0.0048	
2009	1,924.23	0.0051	0.0048	
2010	1,924.23	0.0051	0.0048	
2011	1,924.23	0.0051	0.0048	
2012	1,924.23	0.0051	0.0048	
2013	1,924.23	0.0051	0.0048	
2014	1,924.23	0.0051	0.0048	
2015	1,924.23	0.0051	0.0048	
2016	1,924.23	0.0051	0.0048	
2017	1,924.23	0.0051	0.0048	
2018	1,924.23	0.0051	0.0048	
2019	1,924.23	0.0051	0.0048	
2020	1,924.23	0.0051	0.0048	

Low Carbon Fuels Standards		
	% Reduction	
	Gasoline and	% Reduction
Year	Diesel Fuel	Tank to Wheels
1990	0.00	0.00
2008	0.00	0.00
2009	0.00	0.00
2010	0.00	0.00
2011	0.25	0.18
2012	0.50	0.36
2013	1.00	0.72
2014	1.50	1.08
2015	2.50	1.80
2016	3.50	2.52
2017	5.00	3.60
2018	6.50	4.68
2019	8.00	5.76
2020	10.00	7.20

CM. Methane

CM1. Enteric Fermentation

Source	Number - Head/year (U _{Aani})	Emission Factor kg CH ₄ /head (EF _{MEF})	Conversion factor kg to MT (C ₃)	MT CH ₄ /year (E _{MEF})
Dairy Cow				
Dairy Cows	0.00	123.42	1000.0	0.00
Dairy Cow Replacement Heifers	0.00	61.91	1000.0	0.00
Replacement 0-12 months.	0.00	45.66	1000.0	0.00
Replacement 12-24 Months	0.00	68.91	1000.0	0.00
Beef Cow				
Beef Cows	0.00	93.40	1000.0	0.00
Beef Cow Replacement Heifers	0.00	65.92	1000.0	0.00
Replacement 0-12 months.	0.00	59.30	1000.0	0.00
Replacement 12-24 Months	0.00	68.65	1000.0	0.00
Heifer Stockers	0.00	58.83	1000.0	0.00
Steer Stockers	0.00	57.06	1000.0	0.00
Feedlot Heifers	0.00	33.12	1000.0	0.00
Feedlot Steer	0.00	32.20	1000.0	0.00
Bulls	0.00	53.00	1000.0	0.00
Others				
Sheep	0.00	8.00	1000.0	0.00
Goats	0.00	5.00	1000.0	0.00
Swine	0.00	1.50	1000.0	0.00
Horses	0.00	18.00	1000.0	0.00
			Total	0.00

CM2. Manure Management

CM2. Manure management Source	Number - 1000s Head/year	Typical Animal Mass kg/head (TAM)	Volatile Solids Produced kgVS/1000kg/ year (VS)	Max CH ₄ capacity m³CH ₄ /kgVS	Extent Capacity Realized (MCF)	Density of	MT CH (voor /E)
	(U _{Aani})	(IAM)	year (VS)	(B ₀)	(MCF)	Methane (C ₈)	MT CH ₄ /year (E _{MMM})
Dairy Cow		2012	0070 5				
Dairy Cows	0	604.0	3278.5	0.24	0.499	0.678	0.00
Dairy Cow Replacement Heifers	0	476.0	2707.9	0.17	0.018	0.678	0.00
Replacement 0-12 months.		N/A	N/A	N/A	N/A	N/A	
Replacement 12-24 Months		N/A	N/A	N/A	N/A	N/A	
Beef Cow							
Beef Cows	0	533.0	2499.1	0.17	0.012	0.678	C
Calves	0	118.0	2336.0	0.17	0.012	0.678	C
Beef Cow Replacement Heifers	0	420.0	2707.5	0.17	0.012	0.678	C
Replacement 0-12 months.		N/A	N/A	N/A	N/A	N/A	
Replacement 12-24 Months		N/A	N/A	N/A	N/A	N/A	
Heifer Stockers	0	420.0	3025.3	0.17	0.012	0.678	C
Steer Stockers	0	318.0	2870.1	0.17	0.012	0.678	C
Feedlot Heifers	0	420.0	1269.7	0.33	0.020	0.678	C
Feedlot Steer	0	420.0	1150.9	0.33	0.020	0.678	C
Bulls	0	750.0	2190.0	0.17	0.012	0.678	C
Swine							
Breeding Swine	0	198.0	949.0	0.48	0.447	0.678	C
Market Under 60 lbs	0	15.9	3212.0	0.48	0.436	0.678	C
Market 60-119 lbs	0	40.6	1971.0	0.48	0.436	0.678	C
Market 120-179 lbs	0	67.8	1971.0	0.48	0.436	0.678	C
Market over 180 lbs	0	90.8	1971.0	0.48	0.436	0.678	C
Poultry							
Layers							
Hens > 1 yr	0	1.8	3942.0	0.39	0.103	0.678	C
Pullets	0	1.8	3540.5	0.39	0.103	0.678	C
Chickens	0	1.8	3942.0	0.39	0.103	0.678	C
Broilers	0	0.9	5475.0	0.36	0.015	0.678	C
Turkeys	0	6.8	3540.5	0.36	0.015	0.678	C
Other							
Sheep on Feed	0	27.0	3361.7	0.36	0.012	0.678	0.00
Sheep Not on Feed	0	27.0	3361.7	0.19	0.012	0.678	C
Goats	0	64.0	3478.5	0.17	0.012	0.678	(
Horses	0	450.0	3650.0	0.33	0.012	0.678	(
	-					Total	0.00

CM4. Agricultural Residue Burning

Source	Production - Tons (U _C)	Residue/Crop Ratio (R _{RC})	Fraction Burned (F _{RR})	Fraction Dry	Burning Efficiency (BE)	Combustion Efficiency (CE)	Carbon Content (CC)	Ratio CH ₄ - C (R _{CH4-C})	Conversion CH ₄ - to Mol.Wt. (C ₁₁)	Tons/year (E _{MARB})
Hay (inc Alfalfa)	0.00	0	0.000	0.85	0	0.00	0.00	0.005	1.33	0.00
Barley	0.00	1.2	0.030	0.93	0.93	0.88	0.45	0.005	1.33	0.00
Dry Edible Beans	0.00	2.1	0.000	0.87	0	0.00	0.00	0.005	1.33	0.00
Corn	0.00	1	0.030	0.91	0.93	0.88	0.45	0.005	1.33	0.00
Corn for Grain	0.00	1	0.000	0.91	0	0.00	0.00	0.005	1.33	0.00
Lentils	0.00	2.1	0.000	0.87	0	0.00	0.00	0.005	1.33	0.00
Millet	0.00	1.6	0.000	0.89	0	0.00	0.00	0.005	1.33	0.00
Oats	0.00	1.3	0.000	0.92	0	0.00	0.00	0.005	1.33	0.00
Dry Edible Peas	0.00	1.5	0.000	0.87	0	0.00	0.00	0.005	1.33	0.00
Austrian Winter Peas	0.00	1.5	0.000	0.87	0	0.00	0.00	0.005	1.33	0.00
Wrinkled Seed Peas	0.00	1.5	0.000	0.87	0	0.00	0.00	0.005	1.33	0.00
Peanuts	0.00	1	0.030	0.86	0.93	0.88	0.45	0.005	1.33	0.00
Rice	0.00	1.4	0.097	0.91	0.93	0.88	0.38	0.005	1.33	0.00
Rye	0.00	1.6	0.000	0.90	0	0.00	0.00	0.005	1.33	0.00
Sorghum	0.00	1.4	0.000	0.91	0	0.00	0.00	0.005	1.33	0.00
Soybeans	0.00	2.1	0.030	0.87	0.93	0.88	0.45	0.005	1.33	0.00
Sugarcane	0.00	0.8	0.030	0.62	0.93	0.88	0.42	0.005	1.33	0.00
All Wheat	0.00	1.3	0.030	0.93	0.93	0.88	0.44	0.005	1.33	0.00
Red Clover	0.00	0	0.000	0.00	0	0.00	0.00	0.005	1.33	0.00
White Clover	0.00	0	0.000	0.00	0	0.00	0.00	0.005	1.33	0.00
Birdsfoot Trefoil	0.00	0	0.000	0.00	0	0.00	0.00	0.005	1.33	0.00
Arrowleaf Clover	0.00	0	0.000	0.00	0	0.00	0.00	0.005	1.33	0.00
Crimson Clover	0.00	0	0.030	0.93	0.93	0.88	0.44	0.005	1.33	0.00
Potatoes (inc Sweet)	0.00	0	0.000	0.00	0	0.00	0.00	0.005	1.33	0.00
Cotton	0.00	0	0.000	0.00	0	0.00	0.00	0.005	1.33	0.00
Sugar Beet	0.00	0	0.000	0.00	0	0.00	0.00	0.005	1.33	0.00
Vegetable Crops & Fruit Trees	0.00	0	0.030	0.87	0.93	0.88	0.45	0.005	1.33	0.00
Safflower & Sunflower	0.00	2.1	0.000	0.00	0	0.00	0.00	0.005	1.33	0.00
					•				Total	0.00

CN. Nitrous Oxide

CN1. Manure Management

CN1. Manure Management Source	Total Nitrogen	Manure Anaerobic Lagoons (%	Manure Liquid/Slurry (%s)	Manure Deep Pit (%DP)	Emission Factor for Liquid System (EF _{NMI})	N ₂ O Emissions from Liquid System Mgt.	Manure Solid Storage/ Managed (%SS)	Manure Deep Pit / DryLot (%DP)	Manure Pasture / Poultry (%)	Emission Factor for Solid System (EF _{NMS})	N ₂ O from solid system Mgt.	Total N ₂ O MT/yr (E _{NMM})
Dairy Cow		goone (/-AL/	(7-5/	(1-04)	(NML)	3.	(7-55/	(1-04)	(7-p)	(NMS/	J.	(-NMM)
Dairy Cows	0.00	0	0	N/A	0.001	0.00	0	0	N/A	0.02	0.00	0.00
Dairy Cow Replacement Heifers	0.00	N/A	N/A	N/A	N/A	N/A	0	N/A	N/A	0.02	0.00	
Replacement 0-12 months.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Replacement 12-24 Months	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Beef Cow												
Beef Cows	0.00	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Calves	0.00	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Beef Cow Replacement Heifers	0.00	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Replacement 0-12 months.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Replacement 12-24 Months	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Heifer Stockers	0.00	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Steer Stockers	0.00	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Feedlot Heifers	0.00	N/A	N/A	N/A	N/A	N/A	N/A	0	0	0.02	0.00	
Feedlot Steer	0.00	N/A	N/A	N/A	N/A	N/A	N/A	0	0	0.02	0.00	0.00
Bulls	0.00	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Swine												
Breeding Swine	0.00	0	0	0	0.001	0.00	0	N/A	N/A	0.02	0.00	0.00
Market Under 60 lbs	0.00	0	0	0	0.001	0.00	0	N/A	N/A	0.02	0.00	
Market 60-119 lbs	0.00	0	0	0	0.001	0.00	0	N/A	N/A	0.02	0.00	
Market 120-179 lbs	0.00	0	0	0	0.001	0.00	0	N/A	N/A	0.02	0.00	
Market over 180 lbs	0.00	0	0	0	0.001	0.00	0	N/A	N/A	0.02	0.00	0.00
Poultry												
Layers												<u> </u>
Hens > 1 yr	0.00	0	0	N/A	0.001	0.00	0	N/A	0	0.02	0.00	
Pullets	0.00	0	0	N/A	0.001	0.00	0	N/A	0	0.02	0.00	
Chickens	0.00	0	0	N/A	0.001	0.00	0	N/A	0	0.02	0.00	
Broilers	0.00	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0.02	0.00	
Turkeys	0.00	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0.02	0.00	0.00
Other												
Sheep on Feed	0.00	N/A	N/A	N/A	N/A	N/A	0	N/A	N/A	0.02	0.00	
Sheep Not on Feed	0.00	N/A	N/A	N/A	N/A	N/A	0	N/A	N/A	0.02	0.00	0.00
Goats	0.00	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Horses	0.00	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
											Total	0.00

Emissions from Animals and Runoff

Indirect emissions from animals					
Source	Total Nitrogen Excreted (N _T)	% of Indirect Volitazition (% _{VI})	Rate of conversion from NH ₃ to NO _X (EF _{NH3} . NO _X)	Conversion factor for kg to MT (C ₃)	Tons/year (E _{NIA})
Dairy Cow					
Dairy Cows	0.00	0.20	0.01	1,000	0.00
Dairy Cow Replacement Heifers	0.00	0.20	0.01	1,000	0.00
Replacement 0-12 months.	N/A				
Replacement 12-24 Months	N/A				
Beef Cow					
Beef Cows	0.00	0.20	0.01	1,000	0.00
Calves	0.00	0.20	0.01	1,000	0.00
Beef Cow Replacement Heifers	0.00	0.20	0.01	1,000	0.00
Replacement 0-12 months.	N/A				
Replacement 12-24 Months	N/A				
Heifer Stockers	0.00	0.20	0.01	1,000	0.00
Steer Stockers	0.00	0.20	0.01	1,000	0.00
Feedlot Heifers	0.00	0.20	0.01	1,000	0.00
Feedlot Steer	0.00	0.20	0.01	1,000	0.00
Bulls	0.00	0.20	0.01	1,000	0.00
Swine					
Breeding Swine	0.00	0.20	0.01	1,000	0.00
Market Under 60 lbs	0.00	0.20	0.01	1,000	0.00
Market 60-119 lbs	0.00	0.20	0.01	1,000	0.00
Market 120-179 lbs	0.00	0.20	0.01	1,000	0.00
Market over 180 lbs	0.00	0.20	0.01	1,000	0.00
Poultry					
Layers					
Hens > 1 yr	0.00	0.20	0.01	1,000	0.00
Pullets	0.00	0.20	0.01	1,000	0.00
Chickens	0.00	0.20	0.01	1,000	0.00
Broilers	0.00	0.20	0.01	1,000	0.00
Turkeys	0.00	0.20	0.01	1,000	0.00
Other	•			•	
Sheep on Feed	0.00	0.20	0.01	1,000	0.00
Sheep Not on Feed	0.00	0.20	0.01	1,000	0.00
Goats	0.00	0.20	0.01	1,000	0.00
Horses	0.00	0.20	0.01	1,000	0.00
	•			Total	0.00

Direct emissions from animals

		Emission								i
		Factor for		Manure for				Emission		ı I
		Pastures,		Pasture,				Factor for		ı I
		Ranges and	Conversion	Range and	Managed	Unmanaged	% of	ground	Manure	i
_	Unmanaged	Paddocks	factor for kg	Paddock	Nitrogen	Daily Spread		Application		MT/year
Source	Nitrogen (N _{UM})	(EF _{PRP})	to MT (C ₃)	(M _{PRP})	(N _M)	(N _{DS})	Vol. (% _{VI})	s (EF _{NV})	Soils (MAS)	(E _{NDA})
Dairy Cow										
Dairy Cows	0.00	0.02	1,000	0.000	0.00	0.00	0.20	0.0125	0.000	0.000
Dairy Cow Replacement Heifers	0.00	0.02	1,000	0.000	0.00	0.00	0.20	0.0125	0.000	0.000
Replacement 0-12 months.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	I
Replacement 12-24 Months	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	ı
Beef Cow										
Beef Cows	0.00	0.02	1,000	0.000	N/A	N/A	0.20	0.0125	0.000	0.000
Calves	0.00	0.02	1,000	0.000	N/A	N/A	0.20	0.0125	0.000	0.000
Beef Cow Replacement Heifers	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Replacement 0-12 months.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	ı
Replacement 12-24 Months	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	ı
Heifer Stockers	0.00	0.02	1,000	0.000	N/A	N/A	0.20	0.0125	0.000	0.000
Steer Stockers	0.00	0.02	1,000	0.000	N/A	N/A	0.20	0.0125	0.000	0.000
Feedlot Heifers	N/A	0.02	1,000	0.000	0.00	N/A	0.20	0.0125	0.000	0.000
Feedlot Steer	N/A	0.02	1,000	0.000	0.00	N/A	0.20	0.0125	0.000	0.000
Bulls	0.00	0.02	1,000	0.000	N/A	N/A	0.20	0.0125	0.000	0.000
Swine						•				
Breeding Swine	0.00	0.02	1,000	0.000	0.00	N/A	0.20	0.0125	0.000	0.000
Market Under 60 lbs	0.00	0.02	1,000	0.000	0.00	N/A	0.20	0.0125	0.000	0.000
Market 60-119 lbs	0.00	0.02	1,000	0.000	0.00	N/A	0.20	0.0125	0.000	0.000
Market 120-179 lbs	0.00	0.02	1,000	0.000	0.00	N/A	0.20	0.0125	0.000	0.000
Market over 180 lbs	0.00	0.02	1,000	0.000	0.00	N/A	0.20	0.0125	0.000	0.000
Poultry						•				
Layers										
Hens > 1 yr	N/A	0.02	1,000	0.000	0.00	N/A	0.20	0.0125	0.000	0.000
Pullets	N/A	0.02	1,000	0.000	0.00	N/A	0.20	0.0125	0.000	0.000
Chickens	N/A	0.02	1,000	0.000	0.00	N/A	0.20	0.0125	0.000	0.000
Broilers	N/A	0.02	1,000	0.000	0.00	N/A	0.20	0.0125	0.000	0.000
Turkeys	0.00	0.02	1,000	0.000	0.00	N/A	0.20	0.0125	0.000	0.000
Other			•	•	•	•	•	•		
Sheep on Feed	0.00	0.02	1,000	0.000	0.00	N/A	0.20	0.0125	0.000	0.000
Sheep Not on Feed	0.00	0.02	1,000	0.000	0.00	N/A	0.20	0.0125	0.000	0.000
Goats	0.00	0.02	1,000	0.000	N/A	N/A	0.20	0.0125	0.000	0.000
Horses	0.00	0.02	1,000	0.000	N/A	N/A	0.20	0.0125	0.000	0.000
									Total	0.000

Emissions from Leaching											
							Total				
							Leaching		% of	Total	
		Unvolatized			Leaching		from non-	Total	Volitazation	Leaching	Total from
	Unvolatized	Non-Manure	Conversion	Leaching %	Factor - kg	Molecular	manure	Nitrogen	from	from	Leaching
	Synthetic	Organic	factor for kg	of Soil	N2O-N / kg	Weight Ratio	Fertilizer	Excreted	Manure	Manure	MT/yr
Source	Nitrogen (N _{UVS})	Nitrogen (N _{UVO})	to MT (C ₃)	(% _{Leach})	N (F _{Leach})	N ₂ O:N ₂ (C ₁₀)	(L _{fert})	(N _T)	(% _{VM})	(L _{man})	(E _{NL})
Total emissions of N₂O from Leaching	8,590	3.60	1,000	0.3000	0.025	1.57	0.10	0	0.00	0.00	0.10

Nitrous Oxide from Crop Growth:

Source	Crop Production MTs	Conversion factor for kg to tons (C ₃)	Residue/Crop Ratio (R _{RC})	Fraction Dry	Nitrogen Content of biomass	Nitrogen Fixed by Crops (FN)	Fraction of Residue Applied (F _{RA})	Nitrogen Content of Residue (N _{CR})	Nitrogen Returned to Soil (N _{RS})
Hay (inc Alfalfa)	0.00	1,000	0.0	0.8500	0.03	0	0.00	N/A	0
Barley	0.00	1,000	1.2	0.9300	N/A	0	0.90	0.01	0
Dry Edible Beans	0.00	1,000	2.1	0.8700	0.03	0	1.60	0.02	0
Corn	0.00	1,000	1.0	0.9100	N/A	0	0.90	0.01	0
Corn for Grain	0.00	1,000	1.0	0.9100	N/A	0	0.90	0.01	0
Lentils	0.00	1,000	2.1	0.8700	0.03	0	1.60	0.02	0
Millet	0.00	1,000	1.6	0.8900	N/A	0	0.90	0.01	0
Oats	0.00	1,000	1.3	0.9200	N/A	0	0.90	0.01	0
Dry Edible Peas	0.00	1,000	1.5	0.8700	0.03	0	0.90	0.02	0
Austrian Winter Peas	0.00	1,000	1.5	0.8700	0.03	0	0.90	0.02	0
Wrinkled Seed Peas	0.00	1,000	1.5	0.8700	0.03	0	0.90	0.02	0
Peanuts	0.00	1,000	1.0	0.8600	0.03	0	0.90	0.01	0
Rice	0.00	1,000	1.4	0.9100	N/A	0	1.00	0.01	0
Rye	0.00	1,000	1.6	0.9000	N/A	0	0.90	0.00	0
Sorghum	0.00	1,000	1.4	0.9100	N/A	0	0.90	0.01	0
Soybeans	0.00	1,000	2.1	0.8700	0.03	0	0.90	0.02	0
Sugarcane	0.00	1,000	0.8	0.6200	0.03	0	0.00	N/A	0
All Wheat	0.00	1,000	1.3	0.9300	N/A	0	0.90	0.01	0
Red Clover	0.00	1,000	0.0	0.0000	0.03	0	0.00	N/A	0
White Clover	0.00	1,000	0.0	0.0000	0.03	0	0.00	N/A	0
Birdsfoot Trefoil	0.00	1,000	0.0	0.0000	0.03	0	0.00	N/A	0
Arrowleaf Clover	0.00	1,000	0.0	0.0000	0.03	0	0.00	N/A	0
Crimson Clover	0.00	1,000	0.0	0.0000	0.03	0	0.00	N/A	0
Potatoes (inc Sweet)	0.00	1,000	0.0	0.0000	0.03	0	0.00	0.00	0
Cotton	0.00	1,000	0.0	0.0000	0.03	0	0.00	0.00	0
Sugar Beet	0.00	1,000	0.0	0.0000	0.03	0	0.00	0.00	0
Vegetable Crops & Fruit Trees	0.00	1,000	0.0	0.0000	0.03	0	0.00	0.00	0
Safflower & Sunflower	0.00	1,000	2.1	0.8700	0.03	0	0.90	0.02	0
Total						0			0

Source	Crop Production (Hectares)	Nitrogen Fixed by Crops (FN _T)	Nitrogen Returned to Soil (N _{RST})	Conversion factor for kg to tons (C ₃)	Emission factor for soils (kg N2O-N/kgN) (EF _{DIR})	Molecular Weight Ratio N ₂ O:N ₂ (C ₁₀)	Emission factor kg N ₂ O-N / ha_yr	Emissions in MT (N _{CG})
N2O emissions from Legumes	-	0.00	-	1,000	0.0100	1.57		0.00
N2O emissions from Residues	-	-	0	1,000	0.0100	1.57	-	0.00
N ₂ O from Histols (Temperate Zone)	40.47	-	-	1,000	-	1.57	8	0.51
N ₂ O from Histols (Sub tropic Zone)	0.00	-	-	1,000	-	1.57	12	0.00
							Total	0.51

Emissions from Fertilizers

Source	Target Year Total Fertilizer Use (kg N)	Following Year Total Fertilizer Use (kg N)	(Calendar	Unvolatized N (kg) (NUV)			(metric	Total Emissions from Fertilizers
Synthetic	9,531	9,569	9,544	8,590	954	0.14	0.02	0.15
Organic	110	111	110	4	1			
Dried Manure	1	1	1					
Activated Sewage Sludge	95	96	96					
Other	14	14	14					
Dried Manure %	0.51%	0.51%	0.51%					
Non-Manure Organics	110	110	110	1				

Emissions on N₂O from agricultural residue burning

Source	Production - MTTons (U _C)	Residue/Crop Ratio (R _{RC})	Fraction Burned (F _{RR})	Fraction Dry (F _{DM})	Burning Efficiency (BE)	Combust Efficiency (CE)	Nitrogen Content (NC)	Ratio N2O- N (R _{N2O-N})	Conversion to Mol.Wt. (C ₁₀)	Emissions MT/year (E _{NARB})
Hay (inc Alfalfa)	0.00	0.0000	0.000	0.85	0.000	0.00	N/A	0.007	1.57	0.00
Barley	0.00	1,2000	0.000	0.83	0.930	0.00	0.008	0.007	1.57	0.00
Dry Edible Beans	0.00	2.1000	0.000	0.87	0.000	0.00	0.000	0.007	1.57	0.00
Corn	0.00	1.0000	0.030	0.91	0.930	0.88	0.006	0.007	1.57	0.00
Corn for Grain	0.00	1.0000	0.000	0.91	0.000	0.00	0.006	0.007	1.57	0.00
Lentils	0.00	2.1000	0.000	0.87	0.000	0.00	0.017	0.007	1.57	0.00
Millet	0.00	1.6000	0.000	0.89	0.000	0.00	0.007	0.007	1.57	0.00
Oats	0.00	1.3000	0.000	0.03	0.000	0.00	0.007	0.007	1.57	0.00
Dry Edible Peas	0.00	1.5000	0.000	0.87	0.000	0.00	0.007	0.007	1.57	0.00
Austrian Winter Peas	0.00	1.5000	0.000	0.87	0.000	0.00	0.017	0.007	1.57	0.00
Wrinkled Seed Peas	0.00	1.5000	0.000	0.87	0.000	0.00	0.017	0.007	1.57	0.00
Peanuts	0.00	1.0000	0.030	0.86	0.930	0.88	0.011	0.007	1.57	0.00
Rice	0.00	1,4000	0.097	0.91	0.930	0.88	0.007	0.007	1.57	0.00
Rye	0.00	1,6000	0.000	0.90	0.000	0.00	0.005	0.007	1.57	0.00
Sorghum	0.00	1.4000	0.000	0.91	0.000	0.00	0.011	0.007	1.57	0.00
Soybeans	0.00	2.1000	0.030	0.87	0.930	0.88	0.023	0.007	1.57	0.00
Sugarcane	0.00	0.8000	0.030	0.62	0.930	0.88	0.004	0.007	1.57	0.00
All Wheat	0.00	1.3000	0.030	0.93	0.930	0.88	0.006	0.007	1.57	0.00
Red Clover	0.00	0.0000	0.000	0.00	0.000	0.00	N/A	0.007	1.57	0.00
White Clover	0.00	0.0000	0.000	0.00	0.000	0.00	N/A	0.007	1.57	0.00
Birdsfoot Trefoil	0.00	0.0000	0.000	0.00	0.000	0.00	N/A	0.007	1.57	0.00
Arrowleaf Clover	0.00	0.0000	0.000	0.00	0.000	0.00	N/A	0.007	1.57	0.00
Crimson Clover	0.00	0.0000	0.000	0.00	0.000	0.00	N/A	0.007	1.57	0.00
Potatoes (inc Sweet)	0.00	0.0000	0.000	0.00	0.000	0.00	0.000	0.007	1.57	0.00
Cotton	0.00	0.0000	0.000	0.00	0.000	0.00	0.000	0.007	1.57	0.00
Sugar Beet	0.00	0.0000	0.000	0.00	0.000	0.00	0.000	0.007	1.57	0.00
Vegetable Crops & Fruit Trees	0.00	0.0000	0.000	0.00	0.000	0.00	0.000	0.007	1.57	0.00
Safflower & Sunflower	0.00	2.1000	0.030	0.87	0.930	0.88	0.023	0.007	1.57	0.00
									Total	0.00

D. Summary Table

		Emissions,	CO ₂ E
	Source Type	tons/yr	metric tons/yr
Methane	Enteric Fermentation	0.00	0.00
	Manure Management	0.00	0.00
	Rice Cultivation	0.00	0.00
	Agricultural Residue Burning	0.00	0.00
Total Meth	ane	0.00	0.00
Nitrous	Manure Management	0.00	0.00
Oxide	Animals and Runoff	0.10	31.40
	Crop Growth	0.51	157.72
	Fertilizer Use	0.15	46.52
	Agricultural Residue Burning	0.00	0.00
Total Nitro	us Oxide	0.76	235.63
	Total emissions fro	m Aariculture	235.63

APPENDIX E: REDUCTION MEASURES, ASSUMPTIONS AND ATTRIBUTED REDUCTIONS

Transportation Reduction Measures

R1-T 1 Tire Pressure Program

The AB32 early action measure involves actions to ensure that vehicle tire pressure is maintained to manufacturer specifications. By 2020, this requirement will reduce emissions in California by approximately 0.55 MMTCO₂e, representing 0.3 percent of emissions from passenger/light-duty vehicles in the State.

Reduction to automobiles & light duty Trucks

= 0.30%

R1-T 2 Low Rolling Resistance Tires

This AB32 early action measure would increase vehicle efficiency by creating an energy efficiency standard for automobile tires to reduce rolling resistance. By 2020, this requirement will reduce emissions in California by approximately 0.3 MMTCO₂e, representing 0.2 percent of emissions from passenger/light-duty vehicles in the State.

Reduction to automobiles & light duty Trucks

= 0.30%

R1-T 3 Low Friction Engine Oils

This AB32 early action measure would increase vehicle efficiency by mandating the use of engine oils that meet certain low friction specifications. By 2020, this requirement will reduce emissions in California by approximately 2.8 MMTCO₂e, representing 1.7 percent of emissions from passenger light-duty vehicles in the State.

Reduction to automobiles & light duty Trucks

1.70%

R1-T 4 Goods Movement Efficiency Measures

This AB32 early action measure targets system wide efficiency improvements in goods movement to achieve GHG reductions from reduced diesel combustion. By 2020, this requirement will reduce emissions in California by approximately 3.5 MMTCO₂e, representing 1.6 Percent of emissions from all mobile sources (on-road and off-road) in the State.

Reduction afforded to Medium and Heavy Duty

Vehicle emissions = 1.60%

R1-T 5 Heavy-Duty Vehicle GHG Emission Reduction (Aerodynamic Efficiency)

This AB32 early action measure would increase heavy-duty vehicle (long-haul trucks) efficiency by requiring installation of best available technology and/or CARB approved technology to reduce aerodynamic drag and rolling resistance. By 2020, this requirement will reduce emissions in California by approximately $0.93 \text{ MMTCO}_2\text{e}$, representing 1.9 percent of emissions from heavy-duty vehicles in the State.

Reduction afforded to Heavy Duty Vehicles

emissions = 1.90%

R1-T 6 Medium and Heavy Duty Vehicle Hybridization

The implementation approach for this AB 32 measure is to adopt a regulation and/or incentive program that reduce the GHG emissions of new trucks (parcel delivery trucks and vans, utility trucks, garbage trucks, transit buses, and other vocational work trucks) sold in California by replacing them with hybrids. By 2020, this requirement will reduce emissions in California by approximately $0.5 \, \text{MMTCO}_2 e$, representing $0.2 \, \text{percent}$ of emissions from all on-road mobile sources in the State. This reduction is also equivalent to a $1.0 \, \text{percent}$ reduction of emissions from all heavy-duty trucks in the State.

Reduction afforded to all on-road mobile sources

R2-T 1 Land Use Based trips and VMT Reduction Policies

The demand for transportation is influenced by the density and geographic distribution of people and places. Whether neighborhoods have sidewalks or bike paths, whether homes are within walking distance of shops or transit stops will influence the type and amount of transportation that is utilized. By changing the focus of land use from automobile centered transportation, a reduction in vehicle miles traveled will occur. Changing the focus of land use away from vehicle centered transportation to the increased densities and lay-outs that foster the implementation and use of alternate modes of transportation provides a reduction in VMT for the City.

Assumptions:

- * Reduction in VMT is approximately 4% per year.
- * Measures R2-T2, R2-T3, R2-T5, R2-T6, R2-T8, and R3-T1 are implemented.

Reductions:

Reduction afforded to passenger/light duty
VMT in county

ounty =

4.00%

R2-T 2 Residential Permit Parking

Preferential Permit Parking is a City program that allows residents of qualified neighborhoods to obtain special permits that exempt them and their guests from certain on-street parking time limits or prohibitions in their areas.

Assumptions:

* Measures R1-T1 through R1-T7 and R2-T1 - R2-T2 are implemented

Reduction is equal to 0.1% from all vehicle miles traveled by passenger and light duty vehicles in the County.

Reductions:

Reduction afforded to passenger/light duty

VMT in county = 0.10%

R2-T 3 Bicycle Master Plan

Corona's Bicycle Master Plan is extensive and describes the construction on 11.5 miles of Class I bike paths and 23 miles of Class II and Class III bikeways to build upon the current 8 miles of bikeways.

Increase of 34.5 miles of bikeways

Reduction in VMT per mile of bikeway per 100,000 residents = 0.075%

Total reduction afforded to passenger/light duty VMT = 2.58%

R2-T 4 NEV Plan

Implementation of the WRCOG's Neighborhood Electric Vehicle (NEV) Plan has the potential to decrease VMT in Corona. A conservative estimate for adoption of NEVs by residents is 4%. Each household with an NEV experiences a 12.7% reduction in VMT.

NEV assumes low penetration rate due to NEV plan 0.04 NEV/household VMT Reduction per VEV 0.13

0.0051

Energy Reduction Measures

R1-E 1 Renewable Portfolio Standard for Building Energy Use

Senate Bills (SBs) 1075 (2002) and 107 (2006) created the State's Renewable Portfolio Standard (RPS), with an initial goal of 20 percent renewable energy production by 2010. Executive Order (EO) S-14-08 establishes a RPS target of 33 percent by the year 2020 and requires State agencies to take all appropriate actions to ensure the target is met. The 33 percent RPS by 2020 goal is supported by the California Air Resources Board (CARB), though its feasibility is not certain due to current limitations in production and transmission of renewable energy.

Assumptions:

- * Southern California Edison reaches its 33% goal for 2020.
- * Assumes that in 2008 SCE's renewable portfolio was at 14% with respect to California's
- * Assumes a 19% reduction in emissions from existing kWHs used.
- Assumes R1-E2 through R1-E6 have been implemented.

Reductions:

% Reduction Afforded = 19.00%

R1-E 2 & 3 AB1109 Energy Efficiency Standard for Lighting

Assembly Bill (AB1109) mandated that the California Energy Commission (CEC) on or before December 31, 2008, adopt energy efficiency standards for general purpose lighting. These regulations, combined with other State efforts, shall be structured to reduce State-wide electricity consumption in the following ways:

- * R1-E2: At least 50 percent reduction from 2007 levels for indoor residential lighting by 2018;
- * R1-E3: At least 25 percent reduction from 2007 levels for indoor commercial and outdoor lighting by 2018.

Assumptions:

- * Assumes 20% of residential electrical use is from lighting.
- * Assumes 37.14% of commercial/industrial electrical usage is from lighting.
- * No data was available to determine outdoor lighting use, therefore no reduction was taken.

= 10.00%	=	% reduction from residential electrical use
= 9.29%	=	% reduction from commercial/industrial electrical use
= 9.51%	=	Total

R1-E 4 Electrical Energy Efficiency

This measure captures the emission reductions associated with electricity energy efficiency activities included in CARB's AB32 Scoping Plan that are not attributed to other R1 or R2 reductions, as described in this report. This measure includes energy efficiency measures that CARB views as crucial to meeting the State-wide 2020 target, and will result in additional emissions reductions beyond those already accounted for in California's Energy Efficiency Standards for Residential and Non-Residential Buildings (Title 24, Part 6 of the California Code of Regulations; hereinafter referred to as, "Title 24 Energy Efficiency Standards"), the County's adopted Green Building ordinance (effective January 1, 2011), etc. By 2020, this requirement will reduce emissions in California by approximately 21.3 MMTCO₂e, representing 17.5 percent of emissions from all electricity in the State. This measure includes the following strategies:

- * "Zero Net Energy" buildings (buildings that combine energy efficiency and renewable generation so that they, based on an annual average, extract no energy from the grid);
- Broader standards for new types of appliances and for water efficiency;
- Improved compliance and enforcement of existing standards;
- Voluntary efficiency and green building targets beyond mandatory codes;
- Voluntary and mandatory whole-building retrofits for existing buildings;
- * Innovative financing to overcome first-cost and split incentives for energy efficiency, on-site renewables, and high efficiency distributed generation;
- More aggressive utility programs to achieve long-term savings;
- Water system and water use efficiency and conservation measures;
- * Additional industrial and agricultural efficiency initiatives; and
- Providing real time energy information technologies to help consumers conserve and optimize energy performance.

Assumptions:

- * The percent reduction from California's emissions from various energy efficiency measures is equal to the County's emissions from this measures or 17.5%.
- * Assumes application only to New development

% reduction afforded	=	17.50%
% of 2020 from growth	=	14.03%
% reduction applied	=	2.46%

R1-E 5 Natural Gas Energy Efficiency

This measure captures the emission reductions associated with natural gas energy efficiency activities included in CARB's AB32 Scoping Plan that are not attributed to other R1 or R2 reductions, as described in this report. This measure includes energy efficiency measures that CARB views as crucial to meeting the State-wide 2020 target, and will result in additional emissions reductions beyond those already accounted for in California's Energy Efficiency Standards for Residential and Non-Residential Buildings (Title 24, Part 6 of the California Code of Regulations; hereinafter referred to as, "Title 24 Energy Efficiency Standards"), the County's adopted Green Building ordinance(effective January 1, 2011), etc. By 2020, this requirement will reduce emissions in California by approximately 4.3 MMTCO₂e, representing 6.2 percent of emissions from all natural gas combustion in the State. This measure includes the following strategies:

- * "Zero Net Energy" buildings (buildings that combine energy efficiency and renewable generation so that they, based on an annual average, extract no energy from the grid);
- Broader standards for new types of appliances and for water efficiency;
- Improved compliance and enforcement of existing standards;
- Voluntary efficiency and green building targets beyond mandatory codes;
- Voluntary and mandatory whole-building retrofits for existing buildings;
- * Innovative financing to overcome first-cost and split incentives for energy efficiency, on-site renewables, and high efficiency distributed generation;
- More aggressive utility programs to achieve long-term savings;
- Water system and water use efficiency and conservation measures;
- * Additional industrial and agricultural efficiency initiatives; and
- * Providing real time energy information technologies to help consumers conserve and optimize energy performance.

Assumptions:

- * The percent reduction from California's emissions from various energy efficiency measures is equal to the County's emissions from this measures or 6.2%.
- * Assumes application only to New development

% reduction afforded	=	6.20%
% of 2020 from growth	=	15.31%
% reduction applied	=	0.95%

R1-E 6 Increased Combined Heat and Power

This measure captures the reduction in building electricity emissions associated with the increase of combined heat and power activities, as outlined in CARB's AB32 Scoping Plan. The Scoping Plan suggests that increased combined heat and power systems, which capture "waste heat" produced during power generation for local use, will offset 30,000 GWh State-wide in 2020. Approaches to lowering market barriers include utility-provided incentive payments, a possible CHP portfolio standard, transmission and distribution support systems, or the use of feed-in tariffs. By 2020, this requirement will reduce emissions in California by approximately 6.7 MMTCO₂e, representing 7.6 percent of emissions from all electricity in the State.

Assumptions:

* The percent reduction from California's emissions is equal to the County's emissions from this measures or 7.6%.

Reductions:

% reduction afforded = 7.60%

R1-E 7 Industrial Efficiency Measures

This measure captures the reduction in industrial building energy emissions associated with the energy efficiency measures for industrial sources included in CARB's AB32 Scoping Plan. By 2020, this requirement will reduce emissions in California by approximately 1.0 MMTCO₂e, representing 3.9 percent of emissions from all industrial natural gas combustion in the State. CARB proposes the following possible State-wide measures:

- Oil and gas extraction;
- GHG leak reduction from oil and gas transmission;
- * Refinery flare recovery process improvements; and
- Removal of methane exemption from existing refinery regulations.

Assumptions:

- * The percent reduction from California's emissions is equal to the County's emissions from this measures or 3.9%.
- * Assumes applies to all residential, commercial, and industrial land uses.

Red	uctions:

% reduction afforded = 3.90%

R2-E 1 Residential Energy Efficiency Program

This measure involves the adoption of a program that facilitates energy efficient design for all new residential buildings within the Sutter Pointe Specific Plan to be 20% beyond the current Title 24 Standards which will implement the new development requirements set forth in the Sutter Pointe Specific Plan EIR. This energy efficiency requirement for the Sutter Pointe Specific Plan is equal to that of the LEED for Homes and ENERGY STAR programs.

The 2008 Title 24 Energy Standards were adopted by the Energy Commission on April 23, 2008, with the 2008 Residential Compliance Manual adopted by the Commission on December 17, 2008. Compliance with the 2008 standards went into effect January 1, 2010. In an effort to meet the overall goal of the California Energy Efficiency Strategic Plan of reaching zero net energy for residential buildings by 2020, the stringency of the Title 24 Energy Standards as regulated and required by the State will continue to increase every three years. As energy efficiency standards increase the County may want to periodically re-evaluate their percentage beyond Title 24 goal to ensure it is still a feasibly achievable goal.

To facilitate the implementation of this program, the City could provide all developers with a list of potentially feasible GHG reduction measures that reflect the current state of the regulatory environment prior to design development. The developer will then submit to the City a mitigation report demonstrating which of the proposed reduction measures are feasible as well as why the unselected measures are infeasible. The City will develop a menu of options with points assigned to them. As long as a developer meets the required point allotment (100 points) the developer will meet the requirements of this measure. This system will assure flexibility in the implementation of this reduction measure. Although not limited to these actions, this reduction goal can be achieved through the incorporation of the following:

- * Install energy efficient appliances, including air conditioning and heating units, dishwashers, water heaters, etc.;
- Install solar water heaters;
- * Install top quality windows and insulation:
- Install energy efficient lighting;
- * Optimize conditions for natural heating, cooling and lighting by building siting and orientation.
- * Use features that incorporate natural ventilation:
- * Install light-colored "cool" pavements, and strategically located shade trees along all bicycle and pedestrian routes; and
- * Incorporate skylights; reflective surfaces, and natural shading in buildings design and

Assumptions:

- * Applies to new development only.
- * Assumes new development to be 20% beyond current Title 24.

% of new residential development	=	1.68%
% reduction afforded	=	20.00%
Total % reduction	_	0.34%

R2-E 2 Residential Renewable Energy Program

This measure facilitates the voluntary incorporation of renewable energy (such as photovoltaic panels) into new residential developments. For participating developments, renewable energy application should be such that the new home's projected energy use from the grid is reduced by 50%. The California Energy Commissions' New Solar Homes Partnership is a component of the California Solar Initiative and provides rebates to developers of 6 or more units where 50% of the units include solar power. In addition this measure would encourage that all residents be equipped with "solar ready" features where feasible, to encourage future installation of solar energy systems. These features should include the proper solar orientation (south facing roof sloped at 20° to 55° from the horizontal), clear access on south sloped roofs, electrical conduit installed for solar electric system wiring, plumbing installed for solar hot water systems, and space provided for a solar hot water tank. The incentive program should provide enough funding and other incentives as shown in the R3 measures to result in approximately fifty percent of new residential development participation in this program, thereby resulting in a 25% reduction in electrical consumption from new residential developments.

As an alternative to, or in support of, providing onsite renewable energy, the project proponent can buy into a purchased energy offset program that will allow for the purchase of electricity generated from renewable energy resources offsite. Purchased energy offsets (or a combination of incorporated renewables and purchased offsets) must be equal to 25% of the total projected energy consumption for the development. See R3-E3 for further details on the financing program.

Assumptions:

- * Applies to new development only.
- * Assumes that 50% of new development will participate.
- * Assumes that those developments participating will reduce electrical use by 50%.

Reductions:

% of new residential development = 1.68% % reduction from energy use = 25.00% Total % reduction = 0.42%

R2-E 3 Residential Retrofit Implementation Program

This measure would initiate a City program that facilitates the incorporation of energy reduction measures for residential buildings undergoing major renovations. AB 811 is a potential funding source to the County for implementing incentive programs to encourage residences within the City to undertake energy efficiency retrofitting and reducing energy consumption in retrofitted homes by a minimum of 15%. As with the new development, the City will develop a menu of options with points assigned to them. As long as a developer meets the required point allotment (100 points) the developer will meet the requirements of this measure. This system will be provided to assure flexibility in the implementation of this reduction measure. Although not limited to these actions, this reduction goal can be achieved through the incorporation of the following:

- Replace inefficient air conditioning and heating units with new energy efficient models;
- * Replace older, inefficient appliances with new energy efficient models;
- * Replace old windows and insulation with top-quality windows and insulation;
- Install solar water heaters;
- Replace inefficient and incandescent lighting with energy efficient lighting; and
- * Weatherize the existing building to increase energy efficiency.

Assumptions:

- Applies to existing development only.
- * Assumes that 20% of existing development will participate.
- * Assumes that those developments participating will increase efficiency by 15%.
- Assumes reduction from electrical and natural gas.

29.21%	=	% of 2020 that is existing residential development
15.00%	=	% reduction applied
20.00%	=	% existing homes participating
0.88%	=	Total % reduction

R2-E 4 Residential Renewable Retrofit Program

This measure will initiate an incentive program that encourages residents to retrofit their homes with photovoltaic panels such that 50% of all of the home's electrical usage is offset. The California Energy Commission's Solar Initiative has incentives available to home owners.

Assumptions:

- * Applies to existing development only.
- * Assumes that 20% of existing development will participate.
- * Assumes that those developments participating will reduce emissions from electricity by
- * Assumes reduction from electricity.

Reductions:

29.21%	=	% of 2020 that is existing residential development
50.00%	=	% reduction applied
20.00%	=	% existing homes participating
2.92%	=	Total % reduction

R2-E 5 Commercial Energy Efficiency Program

This measure facilitates the implementation of energy efficient design for all new commercial buildings to be 20% beyond the current Title 24 Standards. This energy efficiency requirement is 10% greater than the minimum requirements of the LEED and ENERGY STAR programs. As energy efficiency standards increase the City may want to periodically re-evaluate their percentage beyond Title 24 goal to ensure it is still a feasibly achievable goal.

As described in R2-E1 above, the City would provide all developers with a list of potentially feasible GHG reduction measures that reflect the current state of the regulatory environment. The City will develop a menu of options with points assigned to them. As long as a developer meets the required point allotment (100 points) the developer will meet the requirements of this measure. This system will provide flexibility in the implementation of this reduction measure. Although not limited to these actions, this reduction goal can be achieved through the incorporation of the following:

- * Install energy efficient appliances, including air conditioning and heating units, dishwashers, water heaters, etc.;
- Install solar water heaters:
- Install top quality windows and insulation;
- Install energy efficient lighting;
- * Optimize conditions for natural heating, cooling and lighting by building siting and orientation.
- * Use features that incorporate natural ventilation;
- * Install light-colored "cool" pavements, and strategically located shade trees along all bicycle and pedestrian routes; and
- Incorporate skylights; reflective surfaces, and natural shading in buildings design and

Assumptions:

- * Applies to new development only.
- * Assumes new development to be 20% beyond current Title 24.

% new com/ind development that is commercial	=	12.36%
% reduction afforded	=	20.00%
Total % reduction	=	2.47%

R2-E 6 Commercial/Industrial Renewable Energy Program

This measure would facilitate the voluntary incorporation of renewable (solar or other renewable) energy generation into the design and construction of new commercial, office, and industrial developments. Renewable energy generation shall be incorporated such that a minimum of 20% of the project's total energy needs are offset. In addition this measure would encourage all facilities be equipped with "solar ready" features where feasible, to facilitate future installation of solar energy systems. These features should include the proper solar orientation (south facing roof sloped at 200 to 550 from the horizontal), clear access on south sloped roofs, electrical conduit installed for solar electric system wiring, plumbing installed for solar hot water systems, and space provided for a solar hot water tank.

As an alternative to, or in support of, providing onsite renewable energy, the project proponent can buy into an offset program that will allow for the purchase of renewable energy resources offsite. Purchased energy offsets (or a combination of incorporated renewables and purchased offsets) must be equal 20% of the total projected energy consumption for the development. See R3-E3 for further details on the financing program.

Assumptions:

- * Applies to new development only.
- * Assumes that 25% of new development will participate.
- * Assumes that those developments participating will reduce electrical use by 20%.

Reductions:

% of com/ind development from growth	=	12.36%
% reduction from program	=	20.00%
% of participation	=	25.00%
Total % reduction	=	0.62%

R2-E 7 Commercial/Industrial Retrofit Program

This measure encourages all commercial or industrial buildings undergoing major renovations to reduce their energy consumption by a minimum of 20%. As with the new development, a menu of options will be provided to assure flexibility in the implementation of this reduction measure. Although not limited to these actions, this reduction goal can be achieved through the incorporation of the following:

- * Replace inefficient air conditioning and heating units with new energy efficient models;
- * Replace older, inefficient appliances with new energy efficient models;
- * Replace old windows and insulation with top-quality windows and insulation;
- Install solar water heaters:
- Replace inefficient and incandescent lighting with energy efficient lighting; and
- * Weatherize the existing building to increase energy efficiency.

Assumptions:

- * Applies to existing development only.
- * Assumes that 20% of existing development will participate.
- * Assumes that those developments participating will increase efficiency by 20%.
- Assumes reduction from electrical and natural gas.

% from existing com/ind development	=	56.76%
% reduction applied	=	20.00%
% of participation	=	20.00%
Total % reduction	=	2.27%

R2-E 8 Induction Streetlight Retrofits

Corona Department of Public Works maintains 12,265 street and safety lights city-wide. With the aid of the Energy Efficiency and Conservation Block Grant funds, the City will replace approximately 16% or 1,920 of the existing standard High Pressure Sodium (HPS) lamps with Induction Lighting. The new lamps are estimated to last 5 times longer and consume 50% less energy than the HPS lamps.

Assumptions:

- * Applies to streetlight electricity consumption
- * Assumes 16% of lamps will be retrofitted
- Retrofitted lamps will use 50% less energy

Reductions:

50.00%	=	% reduction applied
16.00%	=	% streetlights retrofitted
1.13%	=	% 2020 electricity use from streetlights
0.09%	=	Total % reduction

R2-E 9 Solar Power for Water Reclamation Facility #1

In addition to the induction streetlight retrofits, the City plans to utilize funds from the EECBG to increase the number of solar panels at their Water Reclamation Facility #1. The City Department of Water and Power (DWP) is investing \$1 million into the project which will be combined with the \$727,100 from EECBG. This will help reduce the energy load of the facility by an estimated 572,000 kWh annually.

Assumptions:

- Direct reduction in electricity use.
- * 572,000 kWh reduction equates to 173.56 metric tons CO2e

Reductions:

reduction applied (metirc tons CO2e) = 173.56

Area Source Reduction Measures

SCAQMD Healthy Hearths Program

A-2 No new wood burning devices in homes

A-3 10 to 25 Mandatory Curtailment days

Total Heating Days 120 (November-February)

% Reduction 0.15

Water Conservation Measures

Reductions

CO2	2020	R1-W1	R2-W1
Water	21,877.46	17720.745	14176.59587
	261.14	261.14	208.9146972
		4.156.72	3.596.38

R1-W 1 Renewable Portfolio Standard (33% by 2020) Related to Water Supply and Conveyance

This measure would increase electricity production from eligible renewable power sources to 33 percent by 2020. A reduction in GHG emissions results from replacing natural gas-fired electricity production with zero GHG-emitting renewable sources of power. By 2020, this requirement will reduce emissions from electricity used for water supply and conveyance in California by approximately 21.3 MMTCO₂e, representing 15.2 percent of emissions from electricity generation (in-State and imports).

Assumptions:

- The percent reduction from California's emissions is equal to the County's emissions from electricity used for water supply and conveyance or 21%.
- * Assumes applies to all residential, commercial, and industrial land uses.

Reductions:

% reduction afforded = 19.00%

R2-W 1 Water Use Reduction Initiative

This initiative would reduce emissions associated with electricity consumption for water treatment and reduction and therefore are included with the energy reductions. This measure encourages the County to adopt a per capita water use reduction goal in support of the Governors Executive Order S-14-08 which mandates the reduction of water use of 20 percent per capita. The County's adoption of a water use reduction goal would introduce requirements for new development and would provide cooperative support for water purveyors that are required to implement these reductions for existing developments. The County would also provide internal reduction measures such that County facilities will support this reduction requirement. The following represent potential programs that can be implemented to attain this reduction goal.

Water Conservation Program:

Under this program the excessive watering of landscaping, excessive fountain operation, watering during peak daylight hours, water of non-permeable surfaces, excessive water use for noncommercial washing, and water use resulting in flooding or runoff would be prohibited. In addition the program would encourage efficient water use for construction activities, the installation of low-flow toilets and showerheads for all new developments, use of drought-tolerant plants with efficient landscape watering systems for all new developments, recycling of water used for cooling systems, use of pool covers, and the posting of water conservation signage at all hotels.

Water Conservation and Efficiency Incentives

Under the provisions in the Sutter Pointe Specific Plan EIR, new developments within the Sutter Pointe Specific Plan area are required to adhere to the following water conservation and efficiency measures:

- * With the exception of ornamental shade trees, use water-efficient landscapes with native, drought resistant species in all public areas and commercial landscaping. Use water-efficient turf in parks and other turf-dependant spaces;
- Install the infrastructure to use reclaimed water for landscape irrigation and/or washing
- Install water-efficient irrigation systems and devices, such as soil moisture-based irrigation
- * Design buildings and lots to be water efficient. Only install water-efficient fixtures and
- * Restrict water methods (prohibit systems that apply water to non-vegetated surfaces) and control runoff. Prohibit businesses from using pressure washers for cleaning driveways, parking lots, sidewalks, and street surfaces;
- * Provide education about water conservation and available programs and incentives; and
- Construct driveways to single family detached residences, multi-family residences and parking lots with pervious surfaces.

New Development Incentives:

Provide incentives for developers to comply with the California Green Building Standards Code as requirements for all new development. Under this Code new developments are required to reduce indoor potable water use by 20% beyond the Energy Policy Act of 1992 fixture performance requirements, and to reduce outdoor potable water use by 50% from a mid-summer baseline average consumption through irrigation efficiency, native plant selection, the use of recycled water and/or captured rainwater for example.

Water Meter Program:

Encourage water providers to install water meters for all County homes not using wells. This would provide for a better accounting of County water usage and provide potential costing per usage to help offset costs of the implementation of water conservation programs.

Water Efficiency Pricing Program

Under this program, the County would encourage water suppliers to adopt a water conservation pricing schedule (i.e. tiered rate) to encourage efficient water use. Notices could be provided in each billing showing water use budgets and the relationship between the budget and the actual usage.

Water Efficiency Retrofit Program:

This program would encourage upgrades in water efficiency for renovations or additions of residential, commercial, office, and industrial properties equivalent to that of new developments. The County would work with local water purveyors to achieve consistent standards, and to develop, approve, and review procedures for implementation.

Water Efficiency Training and Education:

Under this measure the County, in coordination with local water purveyors would implement a public information and education program that promotes water conservation. The program could include certification programs for irrigation designers, installers, and managers, as well as classes to promote the use

of drought tolerant, native species and xeriscaping.

Increased Recycled Water Use:

Promote the use of municipal wastewater and graywater for agricultural, industrial and irrigation purposes. This measure would be subject to approval of the State Health Department and compliance with Title 22 provisions. This measure would facilitate the following:

- Inventory of non-potable water uses that could be substituted with recycled or graywater;
- Determination of the feasibility of producing and distributing recycled water for groundwater replenishment;
- Determine the associated energy/GHG tradeoffs for treatment/use vs. out of basin water supply usage; and
- Cooperation and coordination with responsible agencies to encourage the use of recycled water where energy tradeoffs are favorable.

Assumptions:

- * Applies to all land uses (existing and new development)
- Assumes emission reduction of 20%.
- * Assumes reduction to electricity used to treat and convey water and wastewater.
- * Assumes that approximately 14% of the electricity usage is used to pump water from wells.

R2-W 1 City Diversion Program

This measure would implement a County wide waste diversion plan to further the goal of diverting 75% of all waste from landfills by 2020. The following is a potential list of waste reduction measures that will further strengthen existing waste reduction/diversion programs.

- * Provide outreach and education programs for residential, commercial, and industrial land uses in order to further promote existing County diversion
- * Increase disposal fees and/or reduce residential pick-up frequency;
- Encourage businesses to adopt a voluntary procurement standard and prioritize those products that have less packaging, are reusable, recyclable, or
- Support State level policies that provide incentives for efficient and reduced packaging waste for commercial products;
- Expand list of recyclable materials;
- * Work with Recology to develop and provide waste audits;
- * Make recycling and composting opportunities mandatory at all public events;
- Establish an appliance end-of-life requirement;
- * For new developments, require the use of recycled-content materials, or recycled materials;
- * Require a minimum of 15% of materials used in construction be sourced locally, as feasible; and
- * Encourage the use of recycled building materials and cement substitutes for new developments.

Assumptions:

- * Applies to existing and future development not associated with Sutter Pointe.
- * Assumes an existing diversion rate of 58%
- * Assumes 2020 goal of 75% diversion rate.
- * Does not apply to construction activities

Reductions:

% reduction applied = 29.31%
% not from construction activities = 87.00%
% reduction applied = 25.50%

APPENDIX F: SCREENING TABLES

Draft

GREENHOUSE GAS EMISSIONS

CEQA Thresholds and Screening Tables City of Corona, California

January 2012

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Introduction

The California Environmental Quality Act ("CEQA") requires assessment of the environmental impacts of proposed projects including the impacts of greenhouse gas emissions. The purpose of this document is to provide guidance on how to analyze green house gas (GHG) emissions and determine the significance of those emissions during CEQA review of proposed development projects within the City of Corona. The analysis, methodology, and significance determination (thresholds) are based upon the Corona Climate Action Plan (CAP), the GHG emission inventories within the CAP, and the GHG reduction measures that reduce emissions to the AB-32 compliant reduction target of the CAP. The Screening Tables can be used by the City of Corona Community Development Department for review of development projects in order to ensure that the specific reduction strategies in the CAP are implemented as part of the CEQA process for development projects. The Screening Tables provide a menu of options that both–ensures implementation of the reduction strategies and flexibility on how development projects will implement the reduction strategies to achieve an overall reduction of emissions, consistent with the reduction target of the CAP.

California Environmental Quality Act

CEQA MANDATES FOR ANALYSIS OF IMPACTS

CEQA requires that Lead Agencies inform decision makers and the public regarding the following: potential significant environmental effects of proposed projects; feasible ways that environmental damage can be avoided or reduced through the use of feasible mitigation measures and/or project alternatives; and the reasons why the Lead Agency approved a project if significant environmental effects are involved (CEQA Guidelines §15002). CEQA also requires Lead Agencies to evaluate potential environmental effects based to the fullest extent possible on scientific and factual data (CEQA Guidelines §15064[b]). A determination of whether or not a particular environmental impact will be significant must be based on substantial evidence, which includes facts, reasonable assumptions predicated upon facts, and expert opinion supported by facts (CEQA Guidelines §15064f[5]).

The recently amended CEQA Guidelines (CEQA Guidelines §15064.4[a] [b]) explicitly requires Lead Agencies to evaluate GHG emissions during CEQA review of potential environmental impacts generated by a proposed project. To assist in this effort, two questions were added to Appendix G of the CEQA Guidelines:

■ Would the Project generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment?

■ Would the Project conflict with any applicable plan, policy or regulation adopted for the purpose of reducing the emissions of GHGs?

Finally, under the "rule of reason," an EIR is required to evaluate impacts to the extent that is reasonably feasible ([CEQA Guideline § 15151; San Francisco Ecology Center v. City and County of San Francisco (1975) 48 Cal.App.3rd 584]). While CEQA does require Lead Agencies to make a good faith effort to disclose what they reasonably can, CEQA does not demand what is not realistically possible ([Residents at Hawks Stadium Committee v. Board of Trustees (1979) 89 Cal.App.3rd 274, 286]).

Greenhouse Gas Impact Determination

STATEWIDE OR REGIONAL THRESHOLDS OF SIGNIFICANCE

There are currently no published statewide or regional thresholds of significance for measuring the impact of GHG emissions generated by a proposed project. CEQA Guidelines §15064.7 indicates only that, "each public agency is encouraged to develop and publish thresholds of significance that the agency uses in the determination of the significance of environmental effects."

QUANTITATIVE ANALYSIS RELATIVE TO THE CORONA CLIMATE ACTION PLAN

METHODOLOGY OVERVIEW

An individual project cannot generate enough GHG emissions to influence global climate change. The project participates in this potential impact by its incremental contribution combined with the cumulative increase of all other sources of GHGs, which when taken together may have a significant impact on global climate change. To address the State's requirement to reduce GHG emissions, the City prepared the CAP with the target of reducing GHG emissions within the City by 15% below existing levels by 2020. The City's target is consistent with the AB 32 target and ensures that Corona is providing GHG reductions locally that will complement the State and international efforts of stabilizing climate change.

Because the City's CAP addresses GHG emissions reduction, is in concert with AB 32 and international efforts to address global climate change, and includes specific local requirements that will substantially lessen the cumulative problem, compliance with the Plan fulfills the description of mitigation found in CEQA Guidelines §15130(a)(3).

Because GHG emissions are only important in the context of cumulative emissions, the focus of the analysis is on answering the question of whether incremental contributions of GHGs are a cumulatively considerable contribution to climate change impacts. The CAP, includes a set of mitigation measures

designed to substantially lessen cumulative impacts associated with GHG emissions as described in CEQA Guidelines §15130(a)(3), in determining if the Project's effects will result in significant impacts. The CAP has the following components that fulfill cumulative mitigation for GHG emissions:

- The CAP provides a community-wide GHG emissions reduction target that will substantially lessen the cumulative problem;
- The CAP provides measures that new development projects must follow to meet the City's reduction target and substantially lessen the cumulative impact; and
- The CAP provides a set of GHG emission inventories that provides quantitative facts and analysis of how the Plan meets the reduction target that substantially lessens the cumulative impact.

The CAP satisfies the first condition by adopting a target of reducing GHG emissions down to 15% below existing levels within the City of Corona by 2020. This reduction target is compliant with AB 32; the AB 32 Climate Change Scoping Plan states: "In recognition of the critical role local governments will play in the successful implementation of AB 32, ARB recommended a greenhouse gas reduction goal for local governments of 15 percent below today's levels by 2020 to ensure that their municipal and community-wide emissions match the State's reduction target" (Scoping Plan page ES-5, CARB, December 2008). The City's Plan matches the State's reduction target, which also coincides with the reduction targets of the Kyoto Protocol. In this way, the City is teaming with the State and international efforts to reduce GHG emissions globally and substantially lessen the cumulative problem.

The CAP satisfies the second condition through the implementation of the reduction measures for new development. This document supplies the specific criteria that new development must follow to ensure that the reduction measures associated with new development are implemented and the reduction target is met.

The CAP satisfies the third criteria by providing a set of community-wide GHG emissions inventories for existing conditions, for future 2020 GHG emissions that are anticipated without the reduction measures (Business As Usual; BAU), and reduced levels of 2020 GHG emissions which demonstrates how the that implementation of reduction measures achieves the reduction target (15% below existing GHG emission levels by 2020). These community-wide GHG emission inventories are found in Appendix B of the CAP.

METHODOLOGY FOR THE CALCULATION OF GHG EMISSIONS

Analysis of development projects can either be done through emissions calculations or by using the screening tables beginning on Page 6.

Total GHG emissions are the sum of emissions from both direct and indirect sources. Direct sources include mobile sources such as construction equipment, motor vehicles, landscape equipment; and

stationary sources such as cooling and heating equipment. Indirect sources are comprised of electrical, and potable water use, and the generation of solid waste, and waste water.

Direct GHG emissions from mobile and stationary sources are determined as the sum of the annual GHG emissions from construction equipment, motor vehicles, landscape equipment, and heating and cooling equipment.

Indirect sources are determined based on source as follows. Electrical usage is reported as annual emissions from electrical usage. Potable water usage is reported as the annual emissions from electricity used for potable water treatment and transportation. Solid waste is reported as the sum of annual emissions from solid waste disposal treatment, transportation, and fugitive emissions of methane at the solid waste facilities. Wastewater usage is reported as the annual emissions from wastewater transport and treatment.

Analysis of development projects not using the screening tables should use the emission factors found in the latest version of the California Climate Action Registry (CCAR) General Reporting Protocol. Quantification of emissions from electricity used for potable water treatment and transportation as well as wastewater transport and treatment can be found in the California Energy Commission (CEC) document titled "Refining Estimates of Water-Related Energy Use in California (CEC December 2006). For analysis of development projects using the screening tables, please refer to the process described on page 6.

Screening Threshold Tables

The purpose of this Screening Table is to provide guidance in measuring the reduction of greenhouse gas emissions attributable to certain design and construction measures incorporated into development projects. The analysis, methodology, and significance determination (thresholds) are based upon the City of Corona Climate Action Plan (CAP), which includes GHG emission inventories, a year 2020 emission reduction target, the goals and policies to reach the target, together with the Programmatic EIR prepared for the CAP. The methodology for the development and application of the Screening Table is set forth in Appendix A, attached hereto.

Instructions for Residential, Commercial, or Industrial Projects

The Screening Table assigns points for each option incorporated into a project as mitigation or a project design feature (collectively referred to as "feature"). The point values correspond to the minimum

emissions reduction expected from each feature. The menu of features allows maximum flexibility and options for how development projects can implement the GHG reduction measures. Projects that garner at least 100 points will be consistent with the reduction quantities anticipated in the City's CAP. As such, those projects that garner a total of 100 points or greater would not require quantification of project specific GHG emissions. Consistent with CEQA Guidelines, such projects would be determined to have a less than significant individual and cumulative impact for GHG emissions.

Instructions for Mixed Use Projects

Mixed use projects provide additional opportunities to reduce emissions by combining complimentary land uses in a manner that can reduce vehicle trips. Mixed use projects also have the potential to complement energy efficient infrastructure in a way that reduces emissions. For mixed use projects, fill out both Screening Table 1 and Table 2, but proportion the points identical to the proportioning of the mix of uses. As an example, a mixed use project that is 50% commercial uses and 50% residential uses will show ½ point for each assigned point value in Table 1 and Table 2. Add the points from both tables. Mixed use Projects that garner at least 100 points will be consistent with the reduction quantities in the City's CAP and are considered less than significant for GHG emissions.

Those Projects that do not garnish 100 points using the screening tables will need to provide additional analysis to determine the significance of GHG emissions. Nothing in this guidance shall be construed as limiting the City's authority to adopt a statement of overriding consideration for projects with significant GHG impacts. The following tables provides a menu of performance standards/options related to GHG mitigation measures and design features that can be used to demonstrate consistency with the reduction measures and GHG reduction quantities in the CAP.

GREENHOUSE GAS EMISSIONS 5 January 2012

Table 1: Screening Table for Implementation of GHG Reduction Measures for Residential Development

Feature	Description	Assigned Point Values	Project Points			
Reduction Measure R2 E1: Energy Efficiency for New Residential						
Building En	velope					
Insulation	Title 24 standard (required)	0 points				
	Modestly Enhanced Insulation (5% > Title 24)	3 points				
	Enhanced Insulation (15%> Title 24)	7 points				
	Greatly Enhanced Insulation (20%> Title 24)	9 points				
Windows	Title 24 standard (required)	0 points				
	Modestly Enhanced Window Insulation (5% > Title 24)	3 points				
	Enhanced Window Insulation (15%> Title 24)	7 points				
	Greatly Enhanced Window Insulation (20%> Title 24)	9 points				
Doors	Title 24 standard (required)	0 points				
	Modestly Enhanced Insulation (5% > Title 24)	3 points				
	Enhanced Insulation (15%> Title 24)	7 points				
	Greatly Enhanced Insulation (20%> Title 24)	9 points				
Air Infiltration	Minimizing leaks in the building envelope is as important as the insulation properties of the building. Insulation does not work effectively if there is excess air leakage.					
	Title 24 standard (required)	0 points				
	Modest Building Envelope Leakage (5% > Title 24)	3 points				
	Reduced Building Envelope Leakage (15%> Title 24)	7 points				
	Minimum Building Envelope Leakage (20% > Title 24)	9 points				
Thermal Storage of Building	Thermal storage is a design characteristic that helps keep a constant temperature in the building. Common thermal storage devices include strategically placed water filled columns, water storage tanks, and thick masonry walls.					
	Thermal storage designed to reduce heating/cooling by 5°F within the building	5 points				
	Thermal storage to reduce heating/cooling by 10°F within the building	10 points				
	Note: Engineering details must be provided to substantiate the efficiency of the thermal storage device.					

CEQA THRESHOLDS AND SCREENING TABLES

Feature	Description	Assigned Point Values	Project Points
Indoor Space	e Efficiencies		
Heating/	Title 24 standard (required)	0 points	
Cooling Distribution	Modest Distribution Losses (5% > Title 24)	3 points	
System	Reduced Distribution Losses (15%> Title 24)	7 points	
	Greatly Reduced Distribution Losses (15%> Title 24)	9 points	
Space Heating/	Title 24 standard (required)	0 points	
Cooling Equipment	Efficiency HVAC (5% > Title 24)	3 points	
_4	High Efficiency HBAC (15%> Title 24)	7 points	
	Very High Efficiency HBAC (20%> Title 24)	9 points	
Water Heaters	Title 24 standard (required)	0 points	
	Efficiency Water Heater (Energy Star conventional that is 5% > Title 24)	3 points	
	High Efficiency Water Heater (Conventional water heater that is 15%> Title 24)	7 points	
	High Efficiency Water Heater (Conventional water heater that is 20%> Title 24)	9 points	
	Solar Water Heating System	12 points	
Daylighting	Daylighting is the ability of each room within the building to provide outside light during the day reducing the need for artificial lighting during daylight hours.		
	All peripheral rooms within the living space have at least one window (required)	0 points	
	All rooms within the living space have daylight (through use of windows, solar tubes, skylights, etc.) such that each room has at least 800 lumens of light during a sunny day	3 points	
	All rooms daylighted to at least 1,000 lumens	5 points	
Artificial	Title 24 standard (required)	0 points	
Lighting	Efficient Lights (5% > Title 24)	3 points	
	High Efficiency Lights (LED, etc. 15%> Title 24)	7 points	
	Very High Efficiency Lights (LED, etc. 20%> Title 24)	9 points	
Appliances	Title 24 standard (required)	0 points	
	Efficient Appliances (5% > Title 24)	3 points	
	High Efficiency Energy Star Appliances (15%> Title 24)	7 points	
	Very High Efficiency Appliances (20%> Title 24)	9 points	

Miscellaneous Residential Building Efficiencies	Feature	Description	Assigned Point Values	Project Points
Independent Independent Provide point values based upon energy efficiency modeling of the Project. Note that engineering data will be required documenting the energy efficiency and point values based upon the proven efficiency beyond Title 24 Energy Efficiency and point values based upon the proven efficiency beyond Title 24 Energy Efficiency Standards. Other	Miscellaneo	us Residential Building Efficiencies		
Energy Efficiency Efficiency and point values based upon the proven efficiency beyond Title 24 Energy Efficiency Standards. Other This allows innovation by the applicant to provide design features that increases the energy efficiency of the project not provided in the table. Note that engineering data will be required documenting the energy efficiency of innovative designs and point values given based upon the proven efficiency of innovative designs and point values given based upon the proven efficiency beyond Title 24 Energy Efficiency Standards. Existing Residential Retrofits The applicant may wish to provide energy efficiency retrofit projects to existing residential dwelling units to further the point value of their project. Retrofiting existing residential dwelling units within the City is a key reduction measure that is needed to reach the reduction goal. The potential for an applicant to take advantage of this program will be decided on a case by case basis and must have the approval of the Corona Planning Department. The decision to allow applicants to ability to participate in this program will be evaluated based upon, but not limited to the following: Will the energy efficiency retrofit project fit within the overall assumptions in Reduction Measure RZE3? Does the energy efficiency retrofit project provide co-benefits important to the City? Point value will be determined based upon engineering and design criteria of the energy efficiency retrofit project. Reduction Measure RZ E2: New Home Renewable Energy Photovoltaic Solar Photovoltaic panels installed on individual homes or in collective neighborhood arrangements such that the total power provided augments: Solar Ready Homes (sturdy roof and electric hookups) 10 percent of the power needs of the project 20 percent of the power needs of the project 30 percent of the power needs of the project 40 percent of the power needs of the project 40 percent of the power needs of the project 50 percent of the power needs of the project 80 per	_		3 point	
increases the energy efficiency of the project not provided in the table. Note that engineering data will be required documenting the energy efficiency of innovative designs and point values given based upon the proven efficiency beyond Title 24 Energy Efficiency Standards. Existing Residential Retrofits The applicant may wish to provide energy efficiency retrofit projects to existing residential dwelling units to further the point value of their project. Retrofitting existing residential dwelling units within the City is a key reduction measure that is needed to reach the reduction goal. The potential for an applicant to take advantage of this program will be decided on a case by case basis and must have the approval of the Corona Planning Department. The decision to allow applicants to ability to participate in this program will be evaluated based upon, blu not limited to the following; Will the energy efficiency retrofit project benefit low income or disadvantaged residents? Does the energy efficiency retrofit project provide co-benefits important to the City? Point value will be determined based upon engineering and design criteria of the energy efficiency retrofit project. Reduction Measure R2 E2: New Home Renewable Energy Photovoltaic Reduction Measure R3 E3: Solar Photovovidaic panels installed on individual homes or in collective neighborhood arrangements such that the total power provided augments: Solar Photovovidaic panels installed on individual homes or in collective neighborhood arrangements such that the total power provided augments: Solar Photovovidaic panels installed on individual homes or in collective neighborhood arrangements such that the total power provided augments: Solar Photovovidaic panels installed on individual homes or in collective neighborhood arrangements such that the total power provided augments: Solar Photovovidaic panels installed on individual homes or in collective neighborhood arrangements such that the total power provided augments: Solar Photovovidaic p	Energy Efficiency	Note that engineering data will be required documenting the energy efficiency and point values based upon the proven efficiency beyond Title 24	TBD	
Residential Retrofits Retrofits Retrofits Retrofits Retrofitsing existing residential dwelling units to further the point value of their project. Retrofitting existing residential dwelling units within the City is a key reduction measure that is needed to reach the reduction goal. The potential for an applicant to take advantage of this program will be decided on a case by case basis and must have the approval of the Corona Planning Department. The decision to allow applicants to ability to participate in this program will be evaluated based upon, but not limited to the following; Will the energy efficiency retrofit project benefit low income or disadvantaged residents? Does the energy efficiency retrofit project fit within the overall assumptions in Reduction Measure RZE3? Does the energy efficiency retrofit project provide co-benefits important to the City? Point value will be determined based upon engineering and design criteria of the energy efficiency retrofit project. Reduction Measure RZ E2: New Home Renewable Energy Photovoltaic Solar Photovoltaic panels installed on individual homes or in collective neighborhood arrangements such that the total power provided augments: Solar Ready Homes (sturdy roof and electric hookups) 10 percent of the power needs of the project 20 percent of the power needs of the project 30 percent of the power needs of the project 40 percent of the power needs of the project 50 percent of the power needs of the project 60 percent of the power needs of the project 70 percent of the power needs of the project 80 percent of the power needs of the project 80 percent of the power needs of the project 90 percent of the power needs of the project 90 percent of the power needs of the project 90 percent of the power needs of the project 90 percent of the power needs of the project 90 percent of the power needs of the project	Other	increases the energy efficiency of the project not provided in the table. Note that engineering data will be required documenting the energy efficiency of innovative designs and point values given based upon the proven efficiency	TBD	
disadvantaged residents? Does the energy efficiency retrofit project fit within the overall assumptions in Reduction Measure R2E3? Does the energy efficiency retrofit project provide co-benefits important to the City? Point value will be determined based upon engineering and design criteria of the energy efficiency retrofit project. Reduction Measure R2 E2: New Home Renewable Energy Photovoltaic Solar Photovoltaic panels installed on individual homes or in collective neighborhood arrangements such that the total power provided augments: Solar Ready Homes (sturdy roof and electric hookups) 10 percent of the power needs of the project 20 percent of the power needs of the project 30 percent of the power needs of the project 40 percent of the power needs of the project 50 percent of the power needs of the project 60 percent of the power needs of the project 70 percent of the power needs of the project 80 percent of the power needs of the project 90 percent of the power needs of the project 90 percent of the power needs of the project 52 points	Residential	existing residential dwelling units to further the point value of their project. Retrofitting existing residential dwelling units within the City is a key reduction measure that is needed to reach the reduction goal. The potential for an applicant to take advantage of this program will be decided on a case by case basis and must have the approval of the Corona Planning Department. The decision to allow applicants to ability to participate in this program will be	TBD	
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10 percent of the power needs of the project 20 percent of the power needs of the project 30 percent of the power needs of the project 40 percent of the power needs of the project 50 percent of the power needs of the project 60 percent of the power needs of the project 70 percent of the power needs of the project 80 percent of the power needs of the project 90 percent of the power needs of the project 52 points 53 points 64 points 65 percent of the power needs of the project 55 points	Photovoltaic			
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30 percent of the power needs of the project 40 percent of the power needs of the project 50 percent of the power needs of the project 60 percent of the power needs of the project 70 percent of the power needs of the project 80 percent of the power needs of the project 90 percent of the power needs of the project 52 points		10 percent of the power needs of the project	10 points	
40 percent of the power needs of the project 50 percent of the power needs of the project 60 percent of the power needs of the project 70 percent of the power needs of the project 80 percent of the power needs of the project 90 percent of the power needs of the project 52 points		20 percent of the power needs of the project	15 points	
50 percent of the power needs of the project 60 percent of the power needs of the project 70 percent of the power needs of the project 80 percent of the power needs of the project 90 percent of the power needs of the project 52 points		30 percent of the power needs of the project	20 points	
60 percent of the power needs of the project 70 percent of the power needs of the project 80 percent of the power needs of the project 90 percent of the power needs of the project 52 points		40 percent of the power needs of the project	28 points	
70 percent of the power needs of the project 80 percent of the power needs of the project 90 percent of the power needs of the project 52 points		50 percent of the power needs of the project	35 points	
80 percent of the power needs of the project 90 percent of the power needs of the project 52 points		60 percent of the power needs of the project	38 points	
90 percent of the power needs of the project 52 points		70 percent of the power needs of the project	42 points	
		80 percent of the power needs of the project	46 points	
100 percent of the power needs of the project 58 points		90 percent of the power needs of the project	52 points	
		100 percent of the power needs of the project	58 points	

Feature	Description	Assigned Point Values	Project Points
Wind turbines	Some areas of the City lend themselves to wind turbine applications. Analysis of the area's capability to support wind turbines should be evaluated prior to choosing this feature.		
	Individual wind turbines at homes or collective neighborhood arrangements of wind turbines such that the total power provided augments:		
	10 percent of the power needs of the project	10 points	
	20 percent of the power needs of the project	15 points	
	30 percent of the power needs of the project	20 points	
	40 percent of the power needs of the project	28 points	
	50 percent of the power needs of the project	35 points	
	60 percent of the power needs of the project	38 points	
	70 percent of the power needs of the project	42 points	
	80 percent of the power needs of the project	46 points	
	90 percent of the power needs of the project	52 points	
	100 percent of the power needs of the project	58 points	
Off-site renewable energy project	The applicant may submit a proposal to supply an off-site renewable energy project such as renewable energy retrofits of existing homes that will help implement R2E4. These off-site renewable energy retrofit project proposals will be determined on a case by case basis and must be accompanied by a detailed plan that documents the quantity of renewable energy the proposal will generate. Point values will be determined based upon the energy generated by the proposal.	TBD	
Other Renewable Energy Generation	The applicant may have innovative designs or unique site circumstances (such as geothermal) that allow the project to generate electricity from renewable energy not provided in the table. The ability to supply other renewable energy and the point values allowed will be decided based upon engineering data documenting the ability to generate electricity.	TBD	
Reduction M	leasure R2 W1: Water Use Reduction Initiative		
Irrigation an	d Landscaping		
Water Efficient	Limit conventional turf to < 20% of each lot (required)	0 points	
Landscaping	Eliminate conventional turf from landscaping	3 points	
	Eliminate turf and only provide drought tolerant plants	4 points	
	Xeroscaping that requires no irrigation	6 points	
Water Efficient irrigation	Drip irrigation	1 point	

Feature	Description	Assigned Point Values	Project Points
systems	Smart irrigation control systems combined with drip irrigation (demonstrate 20 reduced water use)	3 points	
Recycled Water	Graywater (purple pipe) irrigation system on site	5 points	
Storm water Reuse Systems	Innovative on-site stormwater collection, filtration and reuse systems are being developed that provide supplemental irrigation water and provide vector control. These systems can greatly reduce the irrigation needs of a project. Point values for these types of systems will be determined based upon design and engineering data documenting the water savings.	TBD	
Potable Wat	er		
Showers	Title 24 standard (required)	0 points	
	EPA High Efficiency Showerheads (15% > Title 24)	3 points	
Toilets	Title 24 standard (required)	0 points	
	EPA High Efficiency Toilets (15% > Title 24)	3 points	
Faucets	Title 24 standard (required)	0 points	
	EPA High Efficiency faucets (15% > Title 24)	3 points	
Reduction M	leasure R2 T1: Land Use Based Trips and VMT Reduction		
Mixed Use	Mixes of land uses that complement one another in a way that reduces the need for vehicle trips can greatly reduce GHG emissions. The point value of mixed use projects will be determined based upon a Transportation Impact Analysis (TIA) demonstrating trip reductions and/or reductions in vehicle miles traveled. Suggested ranges:	TBD	
	Diversity of land uses complementing each other (2-28 points)		
	Increased destination accessibility other than transit (1-18 points)		
	Increased transit accessibility (1-25 points)		
	Infill location that reduces vehicle trips or VMT beyond the measures described above (points TBD based on traffic data).		
Residential Near Local	Having residential developments within walking and biking distance of local retail helps to reduce vehicle trips and/or vehicle miles traveled.	TBD	
Retail (Residential only Projects)	The point value of residential projects in close proximity to local retail will be determined based upon traffic studies that demonstrate trip reductions and/or reductions in vehicle miles traveled (VMT)		
Other Trip Reduction Measures	Other trip or VMT reduction measures not listed above with TIA and/or other traffic data supporting the trip and/or VMT for the project.	TBD	

Feature	Description	Assigned Point Values	Project Points
Reduction M	Measure R2 T3: Bicycle Master Plan Development		
Bicycle Infrastructure	Corona's Bicycle Master Plan is extensive and describes the construction on 11.5 miles of Class I bike paths and 23 miles of Class II and Class III bikeways to build upon the current 8 miles of bikeways. Provide bicycle paths within project boundaries. Provide bicycle path linkages between residential and other land uses. Provide bicycle path linkages between residential and transit.	TBD 2 points 5 points	
Reduction M	leasure R2 T4: WRCOG Neighborhood Electric Vehicle Plan		
Electric Vehicle Recharging	Provide circuit and capacity in garages of residential units for use by a neighborhood electric vehicle (NEV).	1 point	
	Provide connections to NEV approved roads and bicycle lanes according to WRCOG NEV Plan.	5 points	
Total Points Ear	ned by Residential Project:		

Table 2: Screening Table for Implementation of GHG Reduction Measures for Commercial Development

Feature	Description	Assigned Point Values	Project Points
Reduction N	Measure R2 E5: Energy Efficiency for Commercial Developme	ent	
Building Env	velope .		
Insulation	Title 24 standard (required)	0 points	
	Modestly Enhanced Insulation (5% > Title 24)	4 points	
	Enhanced Insulation (15%> Title 24)	8 points	
	Greatly Enhanced Insulation (20%> Title 24)	12 points	
Windows	Title 24 standard (required)	0 points	
	Modestly Enhanced Window Insulation (5% > Title 24)	4 points	
	Enhanced Window Insulation (15%> Title 24)	8 points	
	Greatly Enhanced Window Insulation (20%> Title 24)	12 points	
Doors	Title 24 standard (required)	0 points	
	Modestly Enhanced Insulation (5% > Title 24)	4 points	
	Enhanced Insulation (15%> Title 24)	8 points	
	Greatly Enhanced Insulation (20%> Title 24)	12 points	
Air Infiltration	Minimizing leaks in the building envelope is as important as the insulation properties of the building. Insulation does not work effectively if there is excess air leakage.		
	Title 24 standard (required)	0 points	
	Modest Building Envelope Leakage (5% > Title 24)	4 points	
	Reduced Building Envelope Leakage (15%> Title 24)	8 points	
	Minimum Building Envelope Leakage (20% > Title 24)	12 points	
Thermal Storage of Building	Thermal storage is a design characteristic that helps keep a constant temperature in the building. Common thermal storage devices include strategically placed water filled columns, water storage tanks, and thick masonry walls.		
	Thermal storage designed to reduce heating/cooling by 5°F within the building	6 points	
	Thermal storage to reduce heating/cooling by 10°F within the building	12 points	
	Note: Engineering details must be provided to substantiate the efficiency of the thermal storage device.		

Feature	Description	Assigned Point Values	Project Points			
Indoor Space	Indoor Space Efficiencies					
Heating/	Title 24 standard (required)	0 points				
Cooling Distribution	Modest Distribution Losses (5% > Title 24)	4 points				
System	Reduced Distribution Losses (15%> Title 24)	8 points				
	Greatly Reduced Distribution Losses (15%> Title 24)	12 points				
Space Heating/	Title 24 standard (required)	0 points				
Cooling Equipment	Efficiency HVAC (5% > Title 24)	4 points				
	High Efficiency HBAC (15%> Title 24)	8 points				
	Very High Efficiency HBAC (20%> Title 24)	12 points				
Commercial Heat Recovery Systems	Heat recovery strategies employed with commercial laundry, cooking equipment, and other commercial heat sources for reuse in HVAC air intake or other appropriate heat recovery technology. Point values for these types of systems will be determined based upon design and engineering data documenting the energy savings.	TBD				
Water Heaters	Title 24 standard (required)	0 points				
	Efficiency Water Heater (Energy Star conventional that is 5% > Title 24)	4 points				
	High Efficiency Water Heater (Conventional water heater that is 15%> Title 24)	8 points				
	High Efficiency Water Heater (Conventional water heater that is 20%> Title 24)	12 points				
	Solar Water Heating System	14 points				
Daylighting	Daylighting is the ability of each room within the building to provide outside light during the day reducing the need for artificial lighting during daylight hours.					
	All peripheral rooms within building have at least one window or skylight	1 points				
	All rooms within building have daylight (through use of windows, solar tubes, skylights, etc.) such that each room has at least 800 lumens of light during a sunny day	5 points				
	All rooms daylighted to at least 1,000 lumens	7 points				
Artificial	Title 24 standard (required)	0 points				
Lighting	Efficient Lights (5% > Title 24)	4 points				
	High Efficiency Lights (LED, etc. 15%> Title 24)	6 points				
	Very High Efficiency Lights (LED, etc. 20%> Title 24)	8 points				

Feature	Description	Assigned Point Values	Project Points
Appliances			
	Title 24 standard (required)	0 points	
	Efficient Appliances (5% > Title 24)	4 points	
	High Efficiency Energy Star Appliances (15%> Title 24)	8 points	
	Very High Efficiency Appliances (20%> Title 24)	12 points	
Miscellaneo	ous Commercial Building Efficiencies		
Building Placement	North/South alignment of building or other building placement such that the orientation of the buildings optimizes conditions for natural heating, cooling, and lighting.	4 point	
Other	This allows innovation by the applicant to provide design features that increases the energy efficiency of the project not provided in the table. Note that engineering data will be required documenting the energy efficiency of innovative designs and point values given based upon the proven efficiency beyond Title 24 Energy Efficiency Standards.	TBD	
Existing Commercial building Retrofits	The applicant may wish to provide energy efficiency retrofit projects to existing residential dwelling units to further the point value of their project. Retrofitting existing commercial buildings within the City is a key reduction measure that is needed to reach the reduction goal. The potential for an applicant to take advantage of this program will be decided on a case by case basis and must have the approval of the Corona Planning Department. The decision to allow applicants to ability to participate in this program will be evaluated based upon, but not limited to the following: Will the energy efficiency retrofit project benefit low income or disadvantaged communities? Does the energy efficiency retrofit project fit within the overall assumptions in Reduction Measure R2E7? Does the energy efficiency retrofit project provide co-benefits important to the City? Point value will be determined based upon engineering and design criteria of the energy efficiency retrofit project.	TBD	

Feature	Description	Assigned Point Values	Project Points			
Reduction M	Reduction Measure R2 E6: New Commercial/Industrial Renewable Energy					
Photovoltaic	Solar Photovoltaic panels installed on commercial buildings or in collective arrangements within a commercial development such that the total power provided augments:					
	Solar Ready Roofs (sturdy roof and electric hookups)	2 points				
	10 percent of the power needs of the project	8 points				
	20 percent of the power needs of the project	14 points				
	30 percent of the power needs of the project	20 points				
	40 percent of the power needs of the project	26 points				
	50 percent of the power needs of the project	32 points				
	60 percent of the power needs of the project	38 points				
	70 percent of the power needs of the project	44 points				
	80 percent of the power needs of the project	50 points				
	90 percent of the power needs of the project	56 points				
	100 percent of the power needs of the project	62 points				
Wind turbines	Some areas of the City lend themselves to wind turbine applications. Analysis of the areas capability to support wind turbines should be evaluated prior to choosing this feature.					
	Wind turbines as part of the commercial development such that the total power provided augments:					
	10 percent of the power needs of the project	8 points				
	20 percent of the power needs of the project	14 points				
	30 percent of the power needs of the project	20 points				
	40 percent of the power needs of the project	26 points				
	50 percent of the power needs of the project	32 points				
	60 percent of the power needs of the project	38 points				
	70 percent of the power needs of the project	44 points				
	80 percent of the power needs of the project	50 points				
	90 percent of the power needs of the project	56 points				
	100 percent of the power needs of the project	62 points				
Off-site renewable energy project	The applicant may submit a proposal to supply an off-site renewable energy project such as renewable energy retrofits of existing residential that will help implement R2E4, or existing commercial/industrial that will help implement R2E7. These off-site renewable energy retrofit project proposals will be determined on a case by case basis accompanied by a detailed plan documenting the quantity of renewable energy the proposal will generate. Point values will be based upon the energy generated by the proposal.	TBD				

Feature	Description	Assigned Point Values	Project Points
Other Renewable Energy Generation	The applicant may have innovative designs or unique site circumstances (such as geothermal) that allow the project to generate electricity from renewable energy not provided in the table. The ability to supply other renewable energy and the point values allowed will be decided based upon engineering data documenting the ability to generate electricity.	TBD	
Reduction N	Measure R2 W1: Water Use Reduction Initiative		
Irrigation ar	nd Landscaping		
Water Efficient	Limit conventional turf to < 20% of each lot (required)	0 points	
Landscaping	Eliminate conventional turf from landscaping	3 points	
	Eliminate turf and only provide drought tolerant plants	4 points	
	Xeroscaping that requires no irrigation	6 points	
Water Efficient	Drip irrigation	1 point	
irrigation systems	Smart irrigation control systems combined with drip irrigation (demonstrate 20 reduced water use)	5 points	
Recycled Water	Graywater (purple pipe) irrigation system on site	5 points	
Storm water Reuse Systems	Innovative on-site stormwater collection, filtration and reuse systems are being developed that provide supplemental irrigation water and provide vector control. These systems can greatly reduce the irrigation needs of a project. Point values for these types of systems will be determined based upon design and engineering data documenting the water savings.	TBD	
Potable Wa	ter		
Showers	Title 24 standard (required)	0 points	
	EPA High Efficiency Showerheads (15% > Title 24)	3 points	
Toilets	Title 24 standard (required)	0 points	
	EPA High Efficiency Toilets/Urinals (15% > Title 24)	3 points	
	Waterless Urinals (note that commercial buildings having both waterless urinals and high efficiency toilets will have a combined point value of 6 points)	3 points	
Faucets	Title 24 standard (required)	0 points	
	EPA High Efficiency faucets (15% > Title 24)	3 points	
Commercial	Title 24 standard (required)	0 points	
Dishwashers	EPA High Efficiency dishwashers (20% water savings)	4 points	

Feature	Description	Assigned Point Values	Project Points
Commercial	Title 24 standard (required)	0 points	
Laundry Washers	EPA High Efficiency laundry (15% water savings)	3 points	
	EPA High Efficiency laundry Equipment that captures and reuses rinse water (30% water savings)	6 points	
Commercial Water Operations Program	Establish an operational program to reduce water loss from pools, water features, etc., by covering pools, adjusting fountain operational hours, and using water treatment to reduce draw down and replacement of water. Point values for these types of plans will be determined based upon design and engineering data documenting the water savings.	TBD	
Reduction M	easure R2 T1: Land Use Based Trips and VMT Reduction Po	licies	
Mixed Use	Mixes of land uses that complement one another in a way that reduces the need for vehicle trips can greatly reduce GHG emissions. The point value of mixed use projects will be determined based upon traffic studies that demonstrate trip reductions and/or reductions in vehicle miles traveled	TBD	
Local Retail Near Residential (Commercial only Projects)	Having residential developments within walking and biking distance of local retail helps to reduce vehicle trips and/or vehicle miles traveled.	TBD	
	The point value of residential projects in close proximity to local retail will be determined based upon traffic studies that demonstrate trip reductions and/or reductions in vehicle miles traveled		
Reduction M	easure R2 T3: Bicycle Master Plan Development		
Bicycle Infrastructure	Corona's Bicycle Master Plan is extensive and describes the construction on 11.5 miles of Class I bike paths and 23 miles of Class II and Class III bikeways to build upon the current 8 miles of bikeways.	TBD	
	Provide bicycle paths within project boundaries.	TBD	
	Provide bicycle path linkages between project site and other land uses.	2 points	
	Provide bicycle path linkages between project site and transit.	5 points	
Total Points Earn	ed by Commercial/Industrial Project:		

References

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- Association of Environmental Professionals (AEP) California Environmental Quality Act 2010 Statute & Guidelines, March 2010.
- California Air Pollution Control Officers Association (CAPCOA), White Paper: CEQA and Climate Change, January 2008
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- U.S. Environmental Protection Agency, AP-42, Compilation of Air Pollutant Emission Factors, Fifth Edition, September 1995
- U.S. Environmental Protection Agency, AP-42, Final Rule on Update to the Compilation of Air Pollutant Emission Factors, October 2009

APPENDIX A: METHDOLOLGY FOR THE DEVELOPMENT AND APPLICATION OF THE SCREENING TABLES

METHODS SUMMARY

The point values in the Screening Tables were derived from the projected emissions reductions that each of the R2 reduction measures within the Corona Climate Action Plan (CAP) would achieve. The reduces emissions for each of the R2 measures are shown in aggregate terms, meaning that the total emission reductions afforded each measure is based on both changes in existing land use activities as well as how new development is designed and built. In order to correctly allocate the emission reductions within the Screening Table, the amount of emission reductions afforded new development had to be segregated out of the aggregate total. Once this process of desegregating new development out of the aggregate reduction totals was completed, the points were then proportioned by residential unit or square feet of commercial/industrial uses. This was accomplished by taking the predicted growth in households and commercial uses in 2020 and proportioning the appropriate R2 reduction quantities for new development to the residential, commercial, and industrial land use sectors within the Screening Table. The result is point values that are proportioned by residential unit or commercial/industrial square feet. Because of this, the size of the project is not relevant to the Screening Table. Regardless of size, each project needs to garnish 100 points to demonstrate consistency with the CAP. Efficiency, not size of the Project is critical. The following equation can be used in determining the amount of emissions reduced per point in the Screening Table:

The emission values in this equation are in metric tons of carbon dioxide equivalents (MTCO2e)

For Residential Projects:

0.019 MTCO2e per Point per Residential Unit

For Commercial and Industrial Projects:

0.024 MTCO2e per Point per 1,000 Square Feet of gross Commercial/Industrial building area

Note that the Screening Table and point values are best used for typical development projects processed by the City. Examples of typical development projects include residential subdivisions, multifamily residential apartments, condominiums and townhouses, retail commercial, big box retail, office buildings, business parks, and typical warehousing. Mixed use projects can use the Screening Tables following the instructions. Transit oriented development (TOD), and infill projects are able to use the Screening Tables, but the Screening Tables points are likely to underestimate total emission reductions afforded these types of projects. Note that the Screening Tables include the opportunity to custom develop points (using the formula above) in order to account for the predicted reductions in vehicle trips and vehicle miles traveled within a project specific traffic study and GHG analysis. TOD and infill projects can be more accurately assessed and allocated points using this method.

However, more unusual types of industrial projects such as cement manufacturing, metal foundries, refrigerant manufacturing, electric generating stations—including large alternative energy electric generation, and oil refineries cannot use the Screening Tables because the emission sources for those types of uses were not contemplated in the tables.

DEVELOPMENT OF THE POINT VALUES

The first step in developing the point system was the need to determine the total reductions afforded the CAP. Figure 1 below shows the total emission reductions achieved by the CAP.

2020 Reductions
(metric tons CO₂e)

Total 2020 GHG Emissions Reductions = 477,644

Electricity and Natural Gas; 207,447; 43.4%

Area Sources; 7,912; 1.7%

Transportation; 253,487; 53.1%

Water; 8,798; 1.8%

Figure 1

In total 477,644 MTCO2e will be reduced as a result of the CAP.

The next step in developing the point system is to segregate out the State efforts in reducing GHG emissions within the City. Table 1 shows the reductions allocated to State measures and City strategies.

Table 1

Conton		2020 Reduction (MTCO₂e)	
Sector	State Strategies	City Strategies	Total
Building Energy -Energy Efficiency and Alternative Energy	145,533	61,914	207,447
Transportation and Land Use	217,428	36,059	253,487
Area Source	7,912	0	7,912
Water Conservation	5,201	3,596	8,798
Total	376,074	101,570	477,644

As shown in Table 1, 101,570 MTCO2e are reduced by the City's R2 measures. This amount includes reductions afforded existing building retrofits, other changes to activities associated with existing land uses, as well as reductions associated with new development.

The next step is to segregate out of the City strategies total the amount of emissions that will be reduced within new development.

Table 2 on the next page summarizes the reduction in emissions afforded new development from the R2 measures. Table 2 shows 31,195 MTCO2e being reduced from new development as a result of the City strategies (R2 measures in the CAP). Within the 31,195 MTCO2e of new development reductions afforded City strategies, 23,203 MTCO2e of emissions reduced is accomplished through new Commercial and Industrial Projects, and 7,993 MTCO2e of emissions reduced is accomplished through new residential projects.

The next step in allocating point values is to determine the number of new homes and commercial buildings that are anticipated by year 2020. The City predicts that 4,164 new residential units will be needed by 2020 to accommodate the population growth by 2020 and a total of approximately 9,747,000 square feet of new commercial and industrial buildings within Corona is needed to accommodate anticipated job growth.

Dividing the 7,993 MTCO2e reductions of emissions afforded the R2 measures for new residential development by the anticipated 4,164 new residential units that will be built yields 1.92 MTCO2e per residential unit that needs to be reduced to fulfill the anticipated reductions of the CAP. That amount equals 100 points, producing the following equation for the point values:

0.019 MTCO2e per Point per Residential Unit

A similar process was used to derive the point value for new commercial/Industrial development: 0.024 MTCO2e per 1,000 Sq. Ft. of gross Commercial/Industrial building area.

The final step was to allocate points to each of the reduction measures in order to provide the menu of point values. The spreadsheet on the next page shows emission reductions afforded each measure. Note that emissions associated with new development are reduced by the State's R1 measures, as well as the City's R2 measures. The Screening Tables focus on those measures the City is implementing associated with new development within the City boundaries. For this reason, the menu of options pertains to all of the R2 measures pertaining to new development.

Table 2

Reduction	Reduced Emissi	ions(MTCO₂e)		
Number	Reduction Measure Name	Commercial/Industrial	Residential	
R2E1	New Homes Energy Efficiency		2,338.6	
R2E2	New Homes Renewable Energy		2,913.4	
R2E5	New Commercial/Industrial Energy Efficiency	16,709.1		
R2E6	New Commercial/Industrial Renewable Energy	4,074.0		
R2T1	Land Use Based trips and VMT Reduction	1,348.2	1348.2	
R2T3	Bicycle Master Plan	834.0	834.0	
R2T4	WRCOG NEV Plan		321.2	
R2W1	Water Use Reduction Initiative	237.4	237.4	
Total R2 Reductions for New Development 23,202.7 7,992.8				